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# THE IRON AGE

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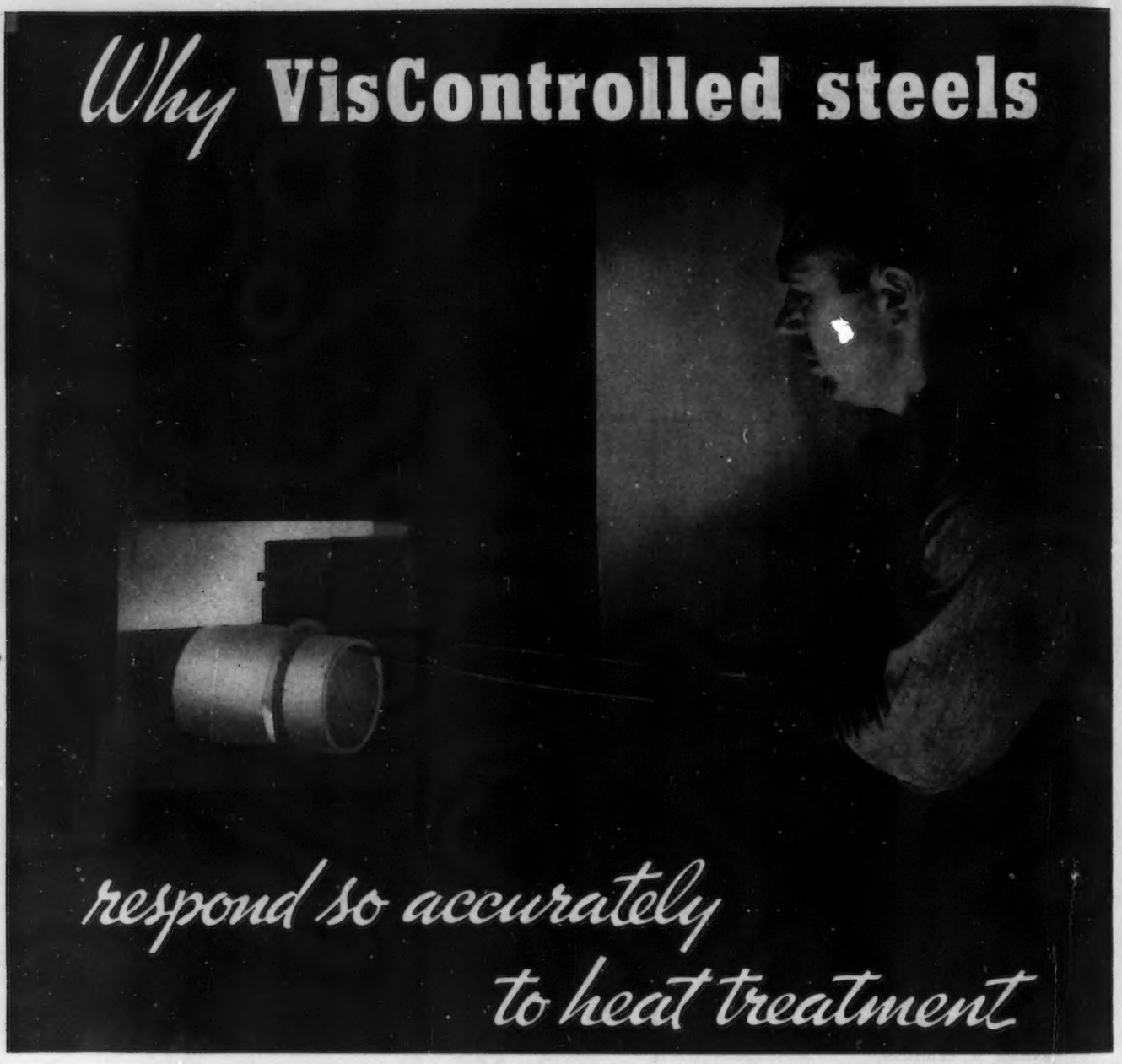
# *Why* VisControlled steels



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October 7, 1937

ESTABLISHED 1855 Vol. 140, No. 15

# Revealment, Not Concealment, Today

OCTOBER is the "convention season" in the metal-working industry as well as other industries. This is the time when men of similar occupation or profession meet in groups to discuss their common current problems and to contribute from their experience to the common fund of knowledge.

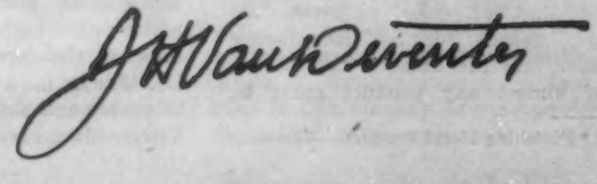
This week, we chronicle the doings and accomplishments of the Association of Iron and Steel Engineers, which has just completed its annual meeting in Chicago. Starting out formerly as the Iron and Steel Electrical Engineers, this association has been broadened to take in the vertical section of professional interest, mechanical, electrical as well as executive, having to do with steel mill equipment and operation.

Today, electricity and electrical apparatus to put it to work are as much a part of the modern steel mill as are the furnaces and the rolling mills. True, the electrical problems encountered in steel making are specialized ones, just as are the mechanical problems of the industry. But a knowledge of both the electrical as well as the mechanical technique is essential to the success of the modern steel production executive and plant engineer. Hence the value of this association of allied interests.

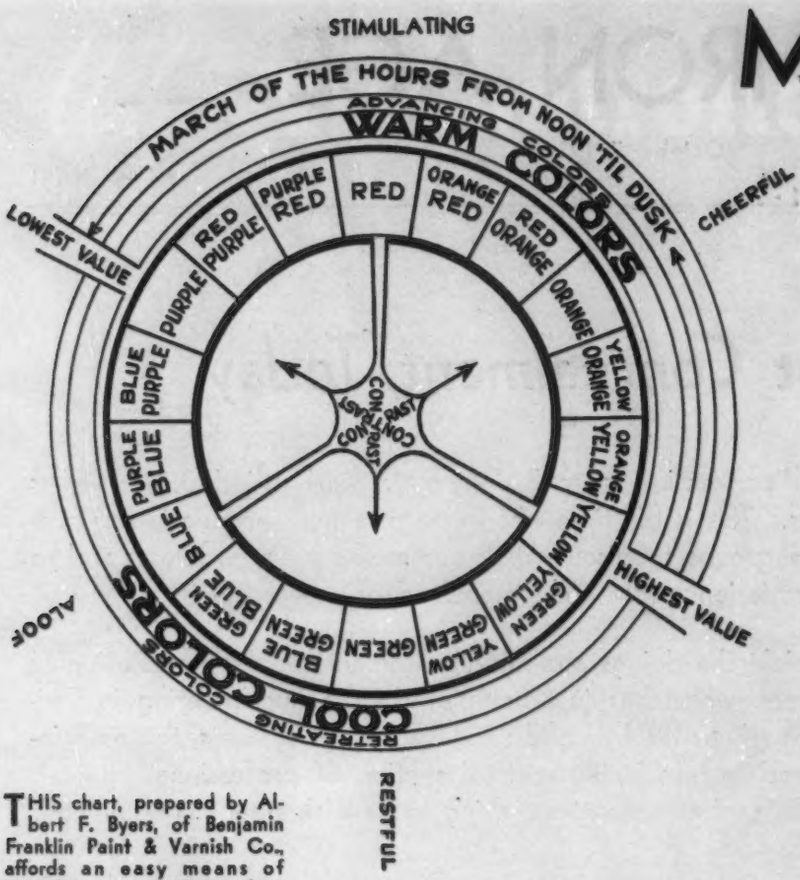
During the remainder of this month, as our convention calendar shows, the industrial paper editor will be hard pressed to keep up with the convention procession. Far from regretting the effort, however, we welcome it. For it is the best sort of proof that we are establishing progress on the firm foundation of mutual help and the interchange of ideas.

Some of us remember the old days of trade secrets in our industry. In those days it was unthinkable that an engineer, if his company had financed him in some important research, would be permitted to share the knowledge gained with his competitors.

That day has passed and it never will return. The technical and professional association sounded its death knell. We have come to know that revealment, not concealment of knowledge, means progress for all.



# Metal Finishing




THIS chart, prepared by Albert F. Byers, of Benjamin Franklin Paint & Varnish Co., affords an easy means of identifying contrasting colors. In general, the so-called warm colors are preferred by women and the cool colors by men.

o o o

By HERBERT R. SIMONDS

*Vice-President, Metal Products Exhibit, Inc., Rockefeller Center, New York*

o o o

A STRONG human trait is the preference for bright color as against drabness. This fact has been recognized in the decorative trades from the time of their inception, but in the utilitarian field progress in use of color has been slow. Only within recent years have such unpretentious items as wrenches and thrashing machines begun to reflect the designer's gradual realization that the human preference for color extends into all branches of industry—even into the foundry, the machine shop and the mine. Thus, when an industrial designer is thoroughly awake to the universality of color response, his only reason for not introducing color into the finished appearance of almost any product must be one of economy. Often when selling expense is considered, however, the saving of production cost through elimination of color proves to be a false economy.

A manufacturer having decided to use color is at once confronted with two problems: first, what color to use; second, how to apply it. A series of articles which ran in THE IRON AGE about a year ago described many methods used for coloring iron, steel, copper, brass, and other metals of industry. Organic coatings were not considered, as the subject was the coloring of metal as distinct from the application of a color coat to the metal. Four methods were described: heat treatment, chemical treatment of surface, alloying and plating. In one of the articles brief reference was made to a new color-by-electrolysis process. Quoting from that article: "It has been found that alkaline solutions of copper lactate produce cathodic deposits at low current density which are highly colored. The color of the deposit, according to Dr. Fink, is a function of its thickness and thus of plating time. Violet, blue, green, yellow, orange and red with intermediate shades appear successively with each cycle. The deposit, which appears to be primarily cuprous oxide, is stable both chemically and mechanically and can be applied to a large variety of metals." It is the purpose of this article to describe the actual application of the process in the shop.

This process, which is covered by patents owned by the Kansas City Testing Laboratory, now is being marketed by United Chromium, Inc., New York, as exclusive licensee. The trade mark "Electrocolor" has been registered by United Chromium to designate articles finished by this process. At its plant at Waterbury, Conn., the company has been carrying on development work in this particular field for several years and is now introducing the process along the same lines it has used heretofore in connection with chromium plating. By the new process, all colors are produced in a bath of uniform composition, which need not be modified in order to effect a change of color.

## Cost of Color Plating

Because of the nature of color plating, it takes its place in the established field of electroplating, and it is expected that much of the color work by this method will be done in existing plating shops. Because of the low current consumption and the comparatively

* Finishing Metal Products—Simonds.

# Color in Industry

**"ELECTROCOLOR" is a new finish for metal. It is applied by electroplating technique and, aside from its eye appeal, it has many interesting advantages, one of which is accuracy of color specification and color reproduction.**

**In this fourth article of a series on metal finishing by Mr. Simonds, a more detailed description of color plating is presented than has been possible heretofore.**

simple equipment, the process is relatively inexpensive. The throwing power of the bath is reported to be sufficiently good to plate recesses without special anodes and to insure uniformity of color on many pieces simultaneously plated. Articles finished in Electrocolor are in most applications coated with a clear lacquer to give increased wear and corrosion resistance.

Exact duplication of color is one of the big advantages claimed for this new process, for as stated, color in every case is a factor of plating time. With a proper time-controlling device it is possible to accurately match colors daily in regular production, and furthermore it is possible to duplicate the color in any other plant by employing the same timing and base metal.

This perhaps is the first time that such a statement could be made. Color matching and color reproduction has always presented difficulties. Color experts have gone to great trouble to establish master color cards which are kept in light-insulated containers to insure them against fading. Such master color standards with uniform designating numbers have been shipped to different countries and different industrial centers in an attempt to establish a uniform color language. This method, while it marks a long step forward in standardization of colors, depends in its final analysis on the color stability of the master plates and in addition has the disadvantage of difficulty when it comes to accurately describing intermediate colors and new color mixtures.

Of course, there have been some attempts made to describe color mechanically. One of the best employs a color analyzing machine, known as photoelectric spectrophotometer, invented by Arthur C. Hardy, of Massachusetts Institute of Technology. Its operation depends chiefly upon the ability of the photoelectric cell to turn light waves into electrical energy. It is claimed that in three minutes after a sample of any colored material is placed in it, the apparatus produces a chart showing precisely how much of each wave length of light is reflected. Each color shade, and there are millions of them, is thus represented by its own peculiar graph. By means of these graphs it is possible to check the matching possibilities of two samples of approximately the same color, but it is difficult to reverse the process and reproduce a color from its graph.

## Metallic Color Cycle

It is possible to finish an Electrocolor article in almost any color of the rainbow and describe it by a simple number (representing the time factor) and have that color accurately reproduced at any time and as many times as desired in any industrial center. The process has been developed for use in industry on such metallic parts as shown in some of the accompanying illustrations. These merely indicate the extent of some of its applications. While it must not be confused with ordinary electroplating, such as chromium plating, properly finished Electrocolor articles which are subsequently lacquered have good corrosion and abrasion resistance, and the colors are said to be actually light fast and free from fading.

In addition, the articles have a transparent metallic luster. The actual color is produced without pigment or dye and is a light interference phenomenon. Light passing through the semi-transparent electrodeposited coating is refracted and reflected to give the resultant color. As the thickness of the coating increases, the color changes through a complete spectrum cycle. This cycle in repeated as the plating builds up, but in each succeeding cycle the colors become darker. Finally, if the plating is continued long enough, deeper and darker shades, tending toward reddish brown, are produced.

The length of plating time may range from 1 min. to ½ hr. or more, and since the rate of change of color is relatively slow, the control of shades can readily be handled in the usual careful commercial practice by controlling plating time.

The gloss or brilliance of the resultant color depends to a large extent upon the nature of the finish on the surface before plating. A highly polished surface gives a mirror-like color finish, while a scratch-brushed surface may in like manner be reproduced in color. Most any base metal

may be used, although for accurate reproduction of a given color the same base metal should be used as that of the original sample. Of course, if a color has been plated on copper in one instance, and the same color is desired on steel, it is a simple matter first to copper plate the steel and then color plate the copper coat.

### Plating Technique

The process is relatively foolproof, and the plating solution is readily maintained for continuous operation by adjusting the essential constituents based on chemical analysis. In a standard tank a bath is made up consisting of a water solution of complex copper ions. Parts to be color plated are introduced into the solution as cathodes and may be hung on standard cathode bars. Anodes are of pure copper. The bath is operated at a low voltage (approximately 0.5 volts being recommended) and at a current density of approximately 0.3 amp. per sq. ft. If a piece is left in the bath beyond the time required to produce the desired color, the colored deposit may be dissolved off and the process started again without injury to the articles being colored and without removing them from the rack. There is no difficulty in such dissolving, it is claimed, nor is there any danger of etching the surface.

### Many Colors Produced

Preparation of the article to be plated is similar to that called for in standard electroplating practice. Articles must be thoroughly cleaned and, of course, must be polished if a high gloss is desired. For color plating, any base metal which is functionally best suited may be used. With some base metals an intermediate step of electroplating with other metals may be indicated for improving the wear and corrosion resistance of the final surface. Such plating may also be required to give an exact match of color. For example, a steel piece may be copper and then nickel plated for the purpose of applying the color over the nickel to secure the desired shade, at the same time producing a finish more resistant to corrosion.

Each cycle in the color plating bath runs through practically the entire range of the spectrum, with the basic characteristics determined by the finish on the underlying metal and by the color thereof. If, for instance, the shade of green produced in the first plating cycle on nickel is too light, a darker shade can be obtained by continuing the plating time to a successive cycle. Or the character of the color may be altered by using a different base metal or by giving the surface a different polishing treatment. When any particular definite effect has been secured, it may be given a number which will specify the surface finish, the nature of the base metal, and the length of time the article has remained in the color plating bath. Thus, this exact shade and character can be reproduced at any future time without color charts or color samples.

Switch plates may be colored either to match trim or to contrast pleasantly with it. In the same way the color of lamp bases may be determined by the lamp shades or other room decoration, and for any one product on a production basis a series of colors may be produced at practically the same cost as if all were of the same color. Thus one batch may be put through the color bath on a 5-min. schedule, and the succeeding batch on a 6-min. schedule. Multi-color combinations are also possible. For instance, two-tone effects may be produced by masking part of the area for a portion of the plating time. Masking may also be used to prevent color plating on a predetermined design. Another method of producing a design is to mask a part through a chromium plating process, and then render passive the design thus plated and put the part through the color plating process.

Rapid advance in the lacquer industry has greatly aided the commercial development of color plating—as it has also aided the usual forms of electroplating. Electrocolor is light fast, but it is a relatively thin plate and thus subject to abrasion. Added protection against abrasion is afforded by some of the new transparent lacquers without loss in appearance. In the same way resistance to alcohol and other solvents may be secured.

NEARLY all decorative metal articles, such as this water bottle, offer a good opportunity for the use of "Electrocolor," a new process employing electroplating technique.

METAL table lamps may be finished in several contrasting colors and the actual hues may be accurately specified by the customer.

### Importance of Color

Some of the ways in which color is used in industry to lower selling costs have been discussed by the author in a recent book.* In the metal industry the introduction of colors first was limited to the simpler hues because of the difficulties involved in the use of

the more complicated shades. Now with Electrocolor available, and also with the greatly increased facilities for metal color finishing in other ways, no longer is it a question of what colors *can* be applied but rather, of what color will have best sales appeal.

Sales of a wide variety of metal products have been increased materially through the use of different colors or color combinations in finish. Even such humble products as hack saw blades have shown a surprising sales response to a color finish.

The Glidden Co. has made an interesting study of color in relation to sales and in a recent publication called "The Age of Color" has specified various color reactions on the part of the public. Quoting, "There never was a time when color meant so much to the social and industrial interests of this nation." In fact, the appeal of color has become important not only in home decoration but also in nearly all merchandise. The reactions of men to various colors differ considerably from the reactions of women to the same colors. Thus men prefer blue in about 45 per cent of all instances, and women prefer red as their first choice in about 42 per cent of all instances. In general women prefer the warm colors such as orange and yellow, while men prefer the cooler colors as indicated in the graph.

PLEASING colors in combination with an aluminum center band have increased sales of this item.

THIS shows a typical case where a metal luster color finish, such as Electrocolor, increases attractiveness while still maintaining the quality of metal.

## Concrete Joist Design Tables

A set of twelve concrete joist and rod spacing scales with design tables, just being announced by the Universal Atlas Cement Co., will prove valuable on the drafting board and designer's table of the architect and the concrete designing engineer because of the time-saving features which these scales and tables include.

The architect who desires to draw in the joists on a sectional drawing will find all of the standard spacings for joists-cast-in-place over 20 in. and 31 in. wide steel forms. The depths of the forms vary from six to 14 in., and the widths of the joists from four to seven inches.

A 16-in. spacing is included for a four in. wide joist with which four-, six- and eight-in. depths of 12 in. clay tile can be used as fillers between joists.

Four standard spacings are provided for use with precast concrete joists.

Scales are included for rod spacings in solid concrete slab construction. There are many ways in which these scales for rod spacings (which vary from 4 in. to 8 in. with ½ in. increases) may be used in the drafting room in addition to the uses for which they are primarily intended, just as the 16 in. spacing for concrete joists with clay tile fillers may be used for spacing wood joists equally as well as the concrete.

The tables on these scales show the necessary design data to make computations of depth of joists and slabs, and the bar sizes required for the sections selected.

Tables are based on the latest approved code recommendations of the American Concrete Institute, viz., fs=20,000 lb. per sq. in. and f'c=3,000 lb. per sq. in.

Joist loading tables for metal forms are by courtesy of the Concrete Reinforcing Steel Institute.

Precast joist loading tables are from the "Precast Joist Concrete Floor Construction Details" of the Portland Cement Association.

Clay tile filler and one-way solid concrete slab floor tables were specially prepared for this set of scales and are in accordance with the provisions of the American Concrete Institute building regulations for reinforced concrete (A.C.I.-501-36-T) for f'c=3,000 lb./sq. in.

Scales are ⅛ in. and ¼ in.= 1 ft. 0 in. with spacings totaling 48 ft. 0 in. and 96 ft. 0 in. respectively. They are printed on a tough, stiff 150-lb. stock having a very durable wearing surface. Scales are along the edges of 4 in. x 14¾ in. sheets with design tables between. In general, tables apply to the scales on the same sheet. Cross references with prominently displayed scale numbers make it easy to locate any desired scale or table.

Sets of these "Concrete Joist Spacing Scales and Design Tables" will be furnished any architect, engineer or general contractor by the Universal Atlas Cement Co., 208 South La Salle Street, Chicago, when requested on business stationery.

# D. C. Drives For Runout

**ON this and following pages are presented abstracts of some of the 25 papers read before the 33rd convention of the Association of Iron and Steel Engineers, held at Chicago, Sept. 28 to Oct. 1. Abstracts of other papers in the group, but not all of them, will appear in succeeding issues. The papers cover a wide range of engineering problems of the steel mill, including such subjects as runout table drives, lubrication of both plain and roller bearings, protective atmospheres for annealing, pickling tank construction, welding techniques, maintenance of electrical systems and combustion engineering problems. Steam generated from gas engine exhaust is a phase of the last named that is discussed.**

o o o

THE writer believes in the advantage of d.c. motors for driving the rollers of runout tables and coilers of modern, wide, hot-strip mills. Under this system each roller or pair is equipped with an individual mill-type d.c. motor, ranging in capacity up to 7.5 or 10 hp. and up to 25 hp. in case of coilers. These motors are subdivided in groups up to 60 or more, and each group is supplied with power from a d.c. generator. Ward-Leonard control is used.

The writer suggested this system late in 1936 in connection with the then proposed 98-in. hot strip mill—in preference to the squirrel cage induction motors and adjustable frequency M-G sets. Since that time not only the 98-in. mill, but a 44-in. and an 80-in. hot strip mill were laid out and ordered with d.c. motors for tables and coilers.

The idea of individual drives for table rollers is more than 25 years old. The mills considered in the earlier years were either narrow strip or hoop mills, or merchant bar mills. The table rollers were light and narrow. Each required a motor of, say, ¼ hp. or ½ hp., and the aggregate capacity seldom exceeded 200 hp. Table rollers were ordinarily kept running continuously, and it was most logical to use squirrel cage motors, and to control their speed as a unit by raising or lowering the supply frequency.

## Size of Units Increasing

With the advent and growth of the wide strip mill, the capacity of the table and coiler drives grew by leaps and bounds. In some cases the total capacity of motors has been over 2000 hp. for a single table. The several table sections and the coilers had to be individually started and stopped. The converting plant consisting of d.c. to a.c. motor-generator sets included six or more sets, aggregating well over 3000 kva.

It became apparent to some that the very capacity of the apparatus made the otherwise good system unwieldy, uneconomical and inefficient.

Its first and inherent handicap is that of any adjustable speed a.c. drive. The only means of adjusting the speed of squirrel cage motors is by varying the applied frequency. There is no practicable means of providing commercially a source of adjustable frequency, except in a rather crude way, by means of a d.c. to a.c. set. Since the power supply is usually a.c., this means that another converter set is used somewhere in the system to provide power to run the adjustable frequency sets. Thus, the power is converted through five machines in succession. Low overall efficiency and high first cost of the converting plant, per unit of power, can hardly be neglected when the power involved becomes large. Likewise, a squirrel cage motor is not particularly well adapted for a rapid start-and-stop service.

## Losses Are Cut

In the proposed d.c. system, each group of motors, say 30 to 60 per table section, is connected to a d.c. generator, having Ward-Leonard control. To start the table, the generator voltage is built up: to stop it, the voltage is rapidly brought to zero, and the table motors pump their energy back. There are no losses similar to rotor losses of squirrel cage motors.

With motor heating reduced so markedly, it is obvious that a smaller continuous motor capacity is required. With this system there are three, instead of five, transformations of power from a.c. supply to table rollers. The conversion losses are cut in half.

## Space Saved in Motor Room

It is ordinarily necessary to adjust separately the speed of each section of the mill runout table—and there usually are five or more such sections. Independent starting and stopping of each table section and of each coiler are also in order. Therefore, if a.c. drives are employed, seldom less than five motor alternates are used, not counting the dynamic braking M-G set. As against this, the several generators for the d.c. table and coiler motors can be conveniently grouped into one or two sets driven by 2200 or 6600-volt motors. The control equipment is elementarily simple and compact. Only small contactors are used to

# Tables and Coilers

By L. A. UMANSKY
*General Electric Co.*

control the generator field. One building bay instead of three is often sufficient.

D.C. motors cost more than the squirrel cage motors. On the other hand, the a.c. or d.c. M-G set and control equipment is less expensive than the adjustable frequency motor-alternators and corresponding control usually required for a wide strip mill. Taking the equipment as a whole, the two types of drives are quite competitive.

Maintenance of the d.c. drives is likely to be higher than that of the squirrel cage motors, due to wear of brushes. The maintenance of the controls is so much simpler and so much easier working with d.c. drives that it is questionable whether the total maintenance expense will be higher.

For years the steel mill engineers have selected the mill type d.c. motor for such tough applications as a blooming mill screwdown, a sideguard, or a charging machine. The choice is made because the d.c. motor and control will do a better job than an a.c. motor and control. The writer is reasonably certain that the runout table and coiler drives will not prove an exception to this rule. He still believes, however, that when the amount of power involved is relatively small, and when starting and stopping is not very frequent—a.c. motors will hold their own. Cost analysis will decide the issue in specific cases.

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# Steel Mill Lubrication and Lubricants for Anti-Friction Bearings

By O. L. MAAG
*Lubrication Engineer*
*The Timken Roller Bearing Co.*

LUBRICATION plays an important part in the modern rolling mill, which is a complex organization offering the lubrication engineer perhaps a wider range of problems than any other industry. All degrees of speed are encountered and loads range from light to extremely heavy. Wide temperature variations must be handled and water, dirt and scale still further complicate the situation.

In the case of anti-friction bearings, the lubricant must act to: (1) Form a film between the operating metal parts, thus preventing metal-to-metal contact and still further reducing the already slight internal friction in the bearing; (2) dissipate heat; (3) aid in keeping out foreign matter such as water, scale, etc., and (4) prevent rust and corrosion.

The film of lubricant is essential, as metal-to-metal contact quickly produces scuffing, galling or excessive wear, any of which will soon ruin a bearing. When equipment is properly designed from the lubrication point of view, which means that the bearing load and operating speed are not excessive, this vital film of lubricant will be established by oils of various viscosities. As the viscosity, or body of the oil, becomes heavier, the load carrying capacity of the oil film increases, unless extreme pressure products are used, when viscosity becomes a secondary factor.

## Heat Due to Many Causes

Heat in an anti-friction bearing may be due to a number of causes. If the bearing is over-loaded, distortion of the races and rollers as they enter and leave the load zone may cause a serious rise in temperature. The use of too much, or the wrong consistency of lubricant, may cause a rise in temperature. If too much or too heavy a lubricant is used, there is bound to be some increase in temperature when the machine starts, usually followed by leakage. An attempt to stop this by tightening the closures will increase the friction, thus still further aggrevating the condition until in extreme cases the bearing fails. In some cases, the surrounding atmosphere may reach a temperature actually injurious to the bearing, due to poor ventilation.

In some steel mills it is expected that the lubricant will aid in keeping foreign matter out of the bearings. This of course is mainly done by the closures, but the use of the correct kind and grade of lubricant will make the problem easier and the whole operation more efficient. When the lubricant is expected to function in part as a seal, it is es-

sential that the lubricant should not thin out too much in service.

The highly polished steel surfaces of anti-friction bearings are easily attacked by rust and corrosion. During shipment and in storage, bearing surfaces are carefully protected with a petrolatum or oil coating; after installation it is the function of the lubricant to maintain a rust and corrosion proof coating on the operating surfaces at all times, necessitating close watch on lubricant specifications.

Since temperature affects the viscosity of a lubricant and therefore its film strength, it is essential that we keep the bearing and lubricant as cool as possible. This can be done by preventing churning, by using as large a volume of lubricant as is consistent with good practice, by installing water jackets around the bearing, or by passing the lubricant through a cooling system. When steel mill bearings and lubricants are maintained at a uniformly low temperature, operators find that it is easier to maintain uniformity in gage and quality of the product being rolled and likewise that the lubricant does not break down as quickly, and lasts longer.

### Water-Free Greases

High temperature conditions are likely to cause foaming and separation of soap and oil, particularly when the grease has a high moisture content. The oil may drain out, leaving only the heavy soap in the housing. It is quite likely that in the near future all operators will insist upon having a grease that has less than 1 per cent of water.

If the grease in a bearing is not renewed for a long time, a deposit of lime or soda soap may form in the housing, reducing the space available for the effective lubricant and at the same time tending to insulate the housing and reduce heat dissipation. And finally, there is the situation which develops when a grease is used that is too heavy to flow into and around the bearing. When this occurs, bearing failure results.

Steel mill equipment frequently includes high-speed units where oil lubrication is desirable. Ordinarily such equipment carries a comparatively light load, but the high speeds have a tendency to develop over-heating unless light-bodied oils are used. Sight feed, constant level, and wick feed oilers are commonly used on equipment of this nature, the last two being the most economical. With the sight feed oiling systems, oils compounded with from ¼ to ½ per cent of soaps adhere better to the bearing surfaces and feed more slowly, affording a degree of economy worth consideration. Recent work along this line has indicated that partially oxidized oils and certain of the newly developed chemical compounds and oily products have shown merit.

### Advantages of Circulating Systems

Circulating oil systems offer a number of advantages in lubricating gear drives and the bearings connected with them. The outstanding advantages of a circulating system are: (1) Ample lubrication; (2) cleansing action; (3) absence of churning and hence lower operating temperatures; (4) provision for settling, filtering or centrifuging the lubricant, or cooling it; and as a result (5) reduction of oxidation and breakdown, thus increasing its life

Gears and anti-friction bearings are often lubricated with the same lubricant. In this case, a mineral oil that is satisfactory for the gears is usually entirely satisfactory for the anti-friction bearings.

It is essential that the mill operator make sure that the lubricant being used does not contain any corrosive or abrasive material. This is particularly essential when any copper bronze bushings are lubricated by the same EP lubricant as is used for the gears and anti-friction bearings.

Likewise, when a circulating oil system is used, it is important that the lubricant, particularly if it is of the EP type, be free from materials which will emulsify in the presence of water and scale. Any emulsions will be thrown out by the filtering or centrifuging equipment and there is danger that the load carrying capacity of the oil may be dangerously reduced without warning.

Due to the design of equipment and the conditions under which it must operate, grease is widely used. Various types of greases are available and care should be exercised in their selection. Lime soap products are ordinarily lowest in price and have the widest use. As they are not particularly affected by water, these greases as well as those compounded with aluminum stearate are widely used for lubricating equipment where moisture may be encountered and where operating speeds are comparatively low. High operating speeds and high temperatures, but without the presence of moisture, call for the use of soda soap lubricants as a general rule, since their melting point is higher.

In all cases where grease is used as a lubricant, it is essential for best results that ample space be provided in the housing. Normally, the housing should not be filled more than half full. This permits the grease to expand without being forced past the closures, avoids churning and assures adequate lubrication without waste. When applying grease to a bearing, special care must be used to see that it is applied directly to the bearing and not merely placed in the housing.

### EP Lubricants Recommended

There can be no question but that EP lubricants are here to stay, and it is safe to say that most greases of tomorrow will be of that type. Bearings of course must be designed with due regard for the type of lubricant to be used, for some extreme pressure lubricants as compounded today have a tendency to cause abrasion or corrosion unless proper precautions are taken. Nevertheless the Timken Roller Bearing Co. now recommends the use of extreme pressure lubricants for all types of bearings in steel mill heavy duty service.

In general, cold worked or milled grease should be used to avoid the possibility of the lubricant thinning out too much in service. Experience indicates that the various types of sulphur-saponifiable, lead-soap-sulphur, chlorinated and phosphorous types or combinations, are satisfactory when properly compounded.

Some greases have the ability to hold considerable water before thinning out too much, which at times is a desirable feature. The average lime soap grease will emulsify with between 20 and 25 per cent of water, any additional water appearing in the form of free globules. This free water is chiefly responsible for etching or corroding bearing surfaces. Operators may expect some trouble from emulsification and scale even when using EP greases. However, since water, and grease containing water in the form of an emulsion,

are lighter than fresh lubricant, the periodic addition of new grease will serve to force the thinner material out of the bearing. Provision should therefore be made in the housing or closure design to permit the removal of emulsified or contaminated grease while fresh lubricant is added.

In the selection of lubricants the bearing size, speed, temperature, load and general operating conditions must all be considered, with the most adverse conditions being chosen as the governing factors. At speeds above 1000 r.p.m. oil is considered more satisfactory than grease, although on the smaller size bearings grease is successfully used. For bearings over 6 in. in outside diameter, medium consistency and medium to soft consistency greases are recommended only up to speeds of 500 r.p.m.

Conditions of high operating temperature require special recommendations. A lime base grease will usually tend to melt at approximately 150-175 deg. F. Soda base greases will usually hold up to over 200 deg., and are therefore more suitable for the higher temperature applications. Above 200 deg., better results are generally secured by using a steam cylinder oil of the proper degree of refinement.

Bearings exposed to extreme cold are best lubricated by an oil with a low viscosity and low cold test. A highly refined mineral oil with a viscosity of 75 to 500 sec., Saybolt Universal, at 100 deg. F. is recommended, depending upon the application.

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# Reasons Governing the Use of Extreme Pressure Lubricants

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By RALPH C. WALTERS
*Penola, Inc.*

o o o

RALPH C. WALTERS

THE present general application of extreme pressure lubricants to steel mill lubrication is a direct result of an experimental application on one of the early 4-high continuous hot strip mills when load conditions on both roll neck roller bearings and mill drives became too severe for ordinary lubricants to handle. It was evident from these tests that lubricants were available which would hold up under high tooth and bearing pressures and it only remained to develop a technique for an extension of their application.

The application of extreme pressure greases to the roller bearings for roll necks is now quite fully developed and can almost be considered standardized. Although this grease was developed primarily for large, heavy-duty roller bearings, it is definitely a general purpose grease, working equally well on either plain or anti-friction bearings and at speeds and temperatures generally encountered in mill operation. This characteristic offers many possibilities for simplified mill lubrication. There are today several mills operating with this single product on every grease lubricated bearing, plain, anti-friction, or sliding, from furnace table and slab return to coiler.

The factors determining the use of extreme pressure lubricants in mill drives are, of course, loads and operating conditions. First, we have the comparatively simple case where changes in product requirements or operation have increased the loads on existing equipment to a point where old methods of lubrication are resulting in drive failures.

Next we have the case where structural limitations determine the size of drives, such as the pinions driving the work rolls of 4-high mills. The loads applied may approach the strength of the material in the pinion teeth. Operating and experimental data indicate that a good gear lubricant will satisfactorily maintain a protective film at tooth pressures up to about 3500 lb. per in. of face. At pressures above this figure an extreme pressure lubricant is definitely required.

(In the full paper, the author presents a graphical method of calculating pinion load conditions directly from tachometer and motor ammeter readings.) The manufacturer is furnishing drives with precision cut gears accurately alined and lapped to per-

fect contact and they must be kept in this condition as nearly as possible. The alinement is of particular importance. Any deviation will, in general, affect the proper tooth contact. With a proper extreme pressure lubricant in use, with the gears in proper alinement and tooth pressures below the limit of strength of the material in the gears, I have never seen a gear failure from pressure alone.

We are all familiar with the more or less general difficulty from contamination experienced with mill drives using a gear lubricant on the gears and a lighter oil on the bearings. An extreme pressure lubricant offers an ideal solution of this problem, for with its high film strength a viscosity light enough to suit the bearing clearances and speeds will still give adequate tooth protection as well as perfect bearing lubrication.

While extreme pressure lubricants have less variation in viscosity at different temperatures than the ordinary gear shields or gear lubricants, it is advisable where gears are operating at tooth pressures in the danger zone to provide cooling for the lubricant during the hot weather or when the drive unit is subject to heat radiation from the mill, and to provide heating in the extreme cold weather in order to maintain the lubricant at its highest operating efficiency. The viscosity should be checked at regular intervals and the product adjusted to the proper viscosity.

In addition to this check, the lubricant, if used in circulating systems, should be periodically filtered or centrifuged, the frequency depending upon operating conditions.

As far as circulating systems are concerned, the same general standards of capacity, pressure, quantity of flow, etc., apply for extreme pressure lubricants as for circulating oil systems. With these precautions being taken, full advantage of the extreme pressure lubricants can be realized and long life of the product assured.

A. E. KROGH

# Control Systems For Soaking Pits

o o o

By A. E. KROGH

*Market Development Department, Brown Instrument Co.*

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THE process of reheating ingots preparatory to rolling is being closely scrutinized nowadays for possible improvement in fuel economy, metallic loss, even heating, increased production, and general all-around efficiency. A number of new pit designs have been made, with the designers outdoing one another in showing increased efficiencies. The results have been highly gratifying, and are, in fact, revolutionizing practices in many mills. The soaking pit is graduating into a heat-treating furnace. While various designs of pits differ in many respects, there is universal agreement that a complete automatic control system is a requisite.

It is important to remember that if automatic control is to be attempted, it should be complete and unified. For instance, the best conceivable pit pressure control could not accomplish the desired ends if the furnace were being fired with a "feast and famine" type of temperature controller, nor can satisfactory economy be secured by a temperature controller if the pressure of the fuel ahead of the valve is allowed to fluctuate.

Agreement seems to be general that complete control of soaking pits involves the following:

1. Control and indication of pit pressure or draft.
2. Control of atmosphere or fuel-air ratio. This frequently also involves control of fuel and air pressures ahead of the controlling valves and control of air preheat temperatures. Preferred forms record and integrate fuel flow and record waste gas analysis.
3. Control of temperature.
4. Control of reversal periods for regenerative pits.
5. Control of fuel limit.
6. Shut-off control of fuel and air when pit is opened.

The desirability of pit pressure or draft control need hardly be stressed. It saves fuel by preventing air infiltration, and tends to maintain the furnace temperature more constant. The control equipment must be very sensitive, independent of temperature fluctuations, anti-hunting, and of a quick-acting type in order to respond quickly and correctly to the many upsets that occur while the pit is being charged and drawn.

A number of installations, involving a bank of pits, have been made wherein the pressure at the base of the stack was controlled for all pits. This can be successfully done only when the proper means are taken to assure that the damper does not hunt in any position.

Control of pit atmosphere is one

of the chief contributing factors to the remarkable evenness of heating and reduction of metallic loss which has resulted from these new pit designs. By keeping the atmosphere surrounding the steel at desired values, washing of the ingots can practically be eliminated, especially when atmosphere control is combined with temperature control. Here again it is important that the sensitivity of the control system be satisfactory, both for the heating and the soaking periods. The radically differing amounts of fuel needed in the two instances require a control system adapted to avoid hunting at all rates of fuel flow.

In selecting temperature control equipment for soaking pits, the first problem is to determine a suitable point of temperature measurement. The use of radiation pyrometers sighted directly upon the ingots has been discouraging due to the flame conditions within the pit. Generally, temperature measurement must be confined to a temperature sensitive device, such as a radiation pyrometer or a thermocouple, measuring the temperature within a refractory tube built into the wall of the pit. Excellent results have also been secured by installing thermocouples in the outlet flues.

The control of reversal periods on regenerative soaking pits has long been practiced at some plants with excellent results. Generally the reversal is determined by the lapse of definite time intervals which may, in some instances, be made to differ for the two sides of a pit. Since the temperature controller will adjust the fuel to maintain a given temperature in the pit, differing consumptions of fuel will be required, depending upon which checker is used for preheating the air, and a recording flow meter, which is a part of the atmosphere control system or of the fuel limit control, will clearly indicate the need for changes in time periods between the two checkers.

Modern pits are being equipped with control instruments that definitely limit the rate of fuel input. The resultant saving in fuel easily pays for the initial investment in a short period of time. The additional saving in avoiding ingot washing is pure profit.

An incidental but important feature of modern control systems for soaking pits is the use of a safety shut-off system which automatically shuts off fuel and air to the burners as soon as the cover is lifted, preparatory to opening the pit. These controls appear somewhat formidable, but when all are combined and engineered into a unified whole, the result will be efficiency and satisfaction of a high order.

# Lubricating Oil Flooded Roll Neck Bearings

By H. H. WOOD
*Engineer, Morgan Construction Co.*

H. H. WOOD

THE Morgoil bearing is a totally enclosed oil film bearing whose inner and outer races are separated by an unbroken oil film. It was developed primarily for use on roll necks in rolling mills where, due to its high load carrying capacity and freedom from fatigue and wear, it has quickly made a place for itself in the ferrous and non-ferrous mills.

The bearing parts proper consist of the roll neck sleeve or inner race with taper bore and cylindrical outside surface and with integral thrust flange. The sleeve rotates with the roll neck inside a steel bushing whose inner surface is coated with a comparatively thin lining of special bearing metal and the sleeve and bushing are separated by the oil film. The thrust bearing, which is double acting, consists of the thrust flange on the sleeve, or the rotating element, and two stationary steel thrust shoes with the surfaces adjacent to the flange of the sleeve also coated with a comparatively thin section of the same special bearing metal used in the bushing. The taper bore roll neck sleeve, whose taper is non-locking, is held in position on the roll neck by a lock nut.

Oil is retained in the bearing by seals of a conventional type at both inboard and outboard ends. As further protection, a water guard seal is applied against the end of the roll barrel.

The Morgoil bearing has a very low coefficient of friction in the range of 0.0015 to 0.003, which is on a par with the coefficient of friction of anti-friction bearings. It is obvious that with almost perfect surface of journal and sleeve that the oil film can be extremely thin and still prevent metal to metal contact, and this results in uniformity of load carrying capacity throughout the speed range of the mill.

The oil enters the Morgoil bear-

ing through a drilled hole in the chock parallel to the axis of the roll. The drilled hole meets two annular grooves extending from slightly above the horizontal center line of a top bearing around the bottom of the chock and up to a point above the center line on the opposite side of the bore. In bottom bearings the annular grooves are reversed and are at the top of the chock. From these grooves the oil is delivered through holes to oil pockets in the bore of the bushing, one on each side centered on the horizontal center line. These oil pockets are kept full of oil under slight pressure. As there is an oil pocket on each side, it does not make any difference which way the bearing runs.

No effort is made to trap the oil in the bearing parts proper. The end leakage from the inboard end drains to an oil sump in the chock. The end leakage from the outboard end lubricates the double-acting thrust bearing and drains to the outboard oil sump. The oil sumps are connected to the receiving tank of the circulating system.

The lubricant supplied to Morgoil roll neck bearings must be a high-grade straight mineral oil free from acid and other impurities and must have a high resistance to oxidation and to the formation of sludge when subjected to hard service. It must separate rapidly from water and other liquid impurities and must, therefore, be a type of oil which shows an excellent demulsibility test.

It is of great importance that the oil be of a type which has a high viscosity index. The viscosity of the oil to be used is determined by the minimum speed of operation of the rolls and also by consideration of the unit loading on the projected area of the bearing. A condition of maximum load, minimum speed and minimum viscosity of oil that will support the load makes for lowest possible coefficient of friction.

### Bearing Meters Its Oil

The quantity of oil needed to lubricate a Morgoil bearing is based on complete replacement of the oil film in a specified number of revolutions. Therefore, a given size bearing operating at high speed needs more oil than the same size bearing at low speed. Oil factors have been developed for each size bearing, which, when multiplied by maximum r.p.m. of the oil to which the bearing is applied, gives the maximum gallons per minute of oil required.

On each side of the mill, there is a flexible supply riser and a drain riser with flexible lines to the chocks. At the top of the supply riser is a pressure gage and a pressure switch with low-limit alarm contact and a red light. This pressure switch is set at a pressure below the normal operating pressure. Usually the red light circuit is tied in to actuate a siren.

Sufficient pressure is carried on the riser to cause the required quantity of oil to flow through the bearings when the mill is operating at absolute top speed. At any speed below the maximum, the bearing acts somewhat as a measuring valve and takes less oil. Normally, Morgoil bearings require from 5 to 15 lb. pressure at the supply riser.

In general, the lubricating system equipment consists of a receiving tank in the oil cellar from which two rotary pumps, take the oil through the floating suctions. Either pump is adequate to supply the maximum amount of lubricant required. The pump delivers the oil through filters from which the oil goes into the main supply line and so to the mill. Beyond the filter there is a lead from the main supply line to a pressure tank with three pressure switches. Two are for the purpose of starting and stopping the service pump and the spare pump and the third switch is used to ring an alarm gong if, for any reason, the pressure on the main supply line is below standard.

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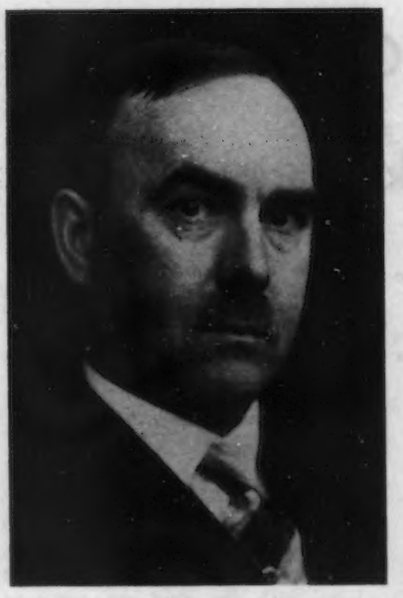

A. N. OTIS

# Protective Annealing Furnaces

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By A. N. OTIS
*General Electric Co.*

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THE largest single application of protective atmospheres in the mills today is for annealing bright sheets and strip. But even though these equipments are used widely, there appears to be some confusion as to the requirements, particularly as to the permissible or desirable moisture content for bright annealing steel. Some specify the use of absorption dryers to remove the moisture content to a very low value, others specify refrigerated coolers, while others get entirely satisfactory results without the use of either.

The laws governing the reactions in these complex gases were outlined by A. L. Marshall in 1933. It was shown that some gases, if too dry, will etch bright steel, producing a gray matte finish, particularly if the CO content is high. It was also shown that for most of the gases tested a considerable moisture content is permissible; that it could be varied over a fairly wide range; and, in some mixtures, was made as high as 20 per cent without change in appearance of bright steel.

### Coke Oven Gas Favored

For bright materials, coke oven gas purified of oxygen and water

In a continuous mill installation, due to the variation in speeds through the mill, the oil requirements for each set of four Morgoil bearings in each stand is different. It is usual, therefore, on the branch from the main supply going to each individual stand to install a pressure reducing and regulating valve of the diaphragm type and these are adjusted to give correct riser pressure, which results in correct oil flow for the maximum operating speed of the stand in question.

In large and important installations using high viscosity oil, it is good practice to install a centrifuge so that if impurities do not settle in the resting compartment even when raising the temperature of the oil by the use of heating coils, it can be centrifuged and purified.

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# Atmospheres for in Steel Mills

vapor is suitable for protection against decarburization, but the methane content (35 per cent $CH_4$) tends to decompose, leaving a carbon deposit on the work, particularly at high annealing temperatures. At 1300 to 1350 deg. F., the usual annealing temperature for carbon steel strip, however, the carbon deposit is not excessive. Purified coke oven gas has one decided advantage, namely that it tends to carburize rather than decarburize, and therefore offers definite protection against loss of carbon from the steel.

For high-grade materials, such as razor blade strip, where the high finish must be preserved in the anneal, dissociated ammonia is preferred. Although relatively expensive, it meets this requirement better than any other readily available gas, and its use is increasing.

An ideal atmosphere for annealing these bright, high-carbon materials would be one that is low in cost, readily available, of low hazard, and it should not oxidize, etch, decarburize or form a soot deposit through the entire annealing range of the materials. While the equilibrium relations indicate that no one mixture will have all of these desirable properties, further study and experimentation may yet produce the desired result.

For materials with mill scale on the surface, atmospheres containing hydrogen will react with the iron oxide to form water vapor, and if CO is present it will react with the scale to form $CO_2$. Since both water vapor and $CO_2$ are decarburizing, they must be avoided. The atmosphere must therefore be inert. The only readily available gas is nitrogen, which can be produced by burning a suitable fuel gas and purifying the products of combustion.

Most hot rolled products have a s l i g h t surface decarburization, which takes place while heating, rolling or cooling in air after rolling. The usual requirement is to preserve the existing condition of the material while annealing, that is, to prevent further decarburization. The mill scale itself tends to protect against further decarburization. An atmosphere for this purpose presents no technical obstacles.

It is sometimes desired that carbon be added to the surface, in order to make up for the loss of carbon while rolling, but so far as the writer knows, a suitable atmosphere for accomplishing this has not yet been put into practical use.

An atmosphere obtained by partial combustion and then removing the water vapor and $CO_2$ products, is used successfully for heat-treating formed or machined parts without decarburization.

### Requirements for Silicon Steel

The requirements for annealing so-called electrical sheets, are exacting, in that it is necessary to secure the lowest magnetic losses obtainable, the sheets must be clean and free from oxidation; they must be flat; and should be so annealed that brittleness is avoided. An annealing temperature of approximately 1900 deg. F. makes difficult the attainment of all these objectives.

Theory and experience indicate the necessity of a pure dry atmosphere, from which all oxygen, sulphur, or water-vapor have been removed. This latter requirement also necessitates that the brickwork of the furnace be thoroughly dry, and that the bases should not be allowed to become cold.

The detrimental effect of moisture in the atmosphere increases with temperature, as it tends to oxidize the silicon, and increase the magnetic losses. Therefore equipment is necessary to dry the atmosphere to a very low dew-point, making it practically moisture free. Much experimental work has been done to determine the effect of various atmosphere gases on the magnetic losses, but with a large stack of wide sheets, it is questionable whether the atmosphere gas can attain access to the surfaces between the sheets of the stack.

The gases driven off by the steel itself should be s w e p t out immediately, particularly when the steel is at high temperature, so that they will not have an opportunity to react with the steel, thus considering the annealing process as a purifying one. Nitrogen, which is quite readily obtainable, when purified and dried, provides a good annealing gas and probably as good as any obtainable. This atmosphere can be produced in the combustion type equipment, supplemented by suitable purifiers and dryers.

### Hydrogen Furnace for Stainless

Bright stainless steel is exceedingly sensitive to discoloration by even slight traces of oxygen or water vapor. Strip of this material has been annealed in a small continuous furnace in the laboratory, with splendid results, but its practical importance remains to be demonstrated. For this work, highly purified hydrogen was used, it being introduced into an inner muffle, located inside the usual muffle tube, ordinary hydrogen being introduced into the outer muffle. In the apparatus used, small amounts of air or water vapor adhering to the strip are consumed in the outer muffle, before the strip enters the inner muffle and sufficient outward flow of purified gas is maintained through the openings of the inner muffle to prevent inward diffusion. Since the strip moves continuously, the time in the furnace is short, and the chamber is of small volume. These conditions undoubtedly are helpful, since it is difficult to secure or to maintain high purity in the atmosphere of a large chamber.

L. C. WERKING

# Carbon—Corrosion-Proof Tank Lining

° ° °

By L. C. Werking
*National Carbon Co.*

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ELEMENTAL carbon is outstanding in its lack of chemical activity. It is inert in all but strongly oxidizing conditions, and hence may be termed corrosion proof, rather than corrosion resistant. Hydrofluoric acid, for example, has no effect on carbon in any concentration. It is this property in particular which makes it exceptionally valuable to picklers of 18-8 and allied steels.

Fabricated forms are practically pure, and, therefore, have elemental characteristics throughout. There is no film which has to be protected, and no danger of a foreign bond dissolving to permit disintegration. Change of characteristics due to aging does not occur either chemically or mechanically.

In practically all conditions, while carbon is not malleable or ductile, it is rugged. It is machinable by grinding or tools, and in forms such as are used for tank linings, it can be handled as ordinary brick would be without danger of breaking or chipping. A list of physical properties will serve to illustrate these points:

| | |
|---|---|
| Compressive strength | 3000 lb. /sq. in. |
| Tensile strength | 1000 lb./sq. in. |
| Transverse modulus | 1700 |
| Coefficient of expansion | 0.000001 per deg. F. |

The coefficient of expansion is so low that there is no danger of a carbon lining expanding more than a retaining shell, causing wall distortion or shell breakage.

With chemical and mechanical properties as near ideal for pickling tank service as can reasonably be expected, the method of application becomes the major problem. Unfortunately, we see no immediate prospect of producing monolithic tanks of the size required by the steel industry, and this material can't be melted and poured into place or applied with a brush.

This leaves only one alternative—to build up a masonry wall using carbon in some suitable shape properly cemented together to form a strong, rigid mass. For tank lining work, regular brick shapes adapt themselves most readily and present less difficulty in laying up than do slabs. Fortunately, adhesion between carbon and cement is good. Any cement suitable in the particular chemical conditions involved is satisfactory. For nitric-hydrofluoric acid combinations, sulphur-base cements containing carbon fillers are the only ones that have proved to be entirely satisfactory. Excellent progress in the use of plasticizers in these cements in recent years has done much to improve tank lining practice, and to increase cement life.

Since without special treatment, carbon is somewhat porous, it can only be used in tanks as a corrosion-proof lining to protect a rigid self-supporting shell. The shell should be coated with an impervious coating chemically suited to the work involved, and inside of these a carbon brick lining of sufficient thickness to provide final protection should be applied.

## Lining Material Under the Brick

In order to produce a perfectly tight tank lining materials such as the asphalts, rubber, and other organic materials, should be used as the final protection to the shell. They not only compensate for the porosity of the brick, but also for the slight imperfections which frequently occur in laying up a lining. Incidentally, a material which may be subject to chemical attack, if used by itself may last almost indefinitely if protected by a properly laid up lining. The masonry and backing are in such close contact that any seepage can attack at the point of contact only, and the seeping acid becomes dissipated before any appreciable attack occurs. Rubber, various loaded asphalts, asphalt membranes, and alternate layers of plasticized sulphur and asphalt are all giving good service. The thickness need not exceed ¼ in.

Actual operating experience in tanks operating over a period of years shows that ample thermal and chemical protection is afforded to backing or sealing materials by carbon linings using only a 2½-in. thickness of carbon under temperature conditions normally existing

in nitric-hydrofluoric pickling baths.

There are now in service, tanks ranging in size up to 60 ft. long with linings ranging from 2½ to 10 in. of carbon. Obviously, when there is likelihood of heavy loads being dropped into a tank, the construction must be heavier than that required for continuous strip or light sheet.

The laying up of a carbon lining with poured sulphur cement is fundamentally simple. A complete course of brick is laid up on the tank bottom on spacers about ¼ in. thick made of either carbon or the cement, with the same spacing allowed between brick, and the cement is poured in the vertical joints until each brick is completely embedded in the cement. Wall construction is similar, except that a single vertical course is laid at a time, and if multiple course thickness is used, all courses in thickness are laid at one time. Paper strips are generally glued over the open joints to prevent loss of the molten cement.

Like many things fundamentally simple, the technique of handling a poured cement properly is one which is developed through experience, and in our opinion unless a plant has had experience in this work, it is advisable to employ the services of an engineering company experienced in handling this type of material.

Work on carbon lined pickling tanks for severe corrosive conditions first started in 1932, and a recent check on the condition and service of some of the early tanks shows that only minor repairs have been required up to the present time, and that the carbon brick are apparently good for an indefinite period.

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# The Development of Steam Generation From Gas Engine Exhaust

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By T. A. LEWIS
*Combustion Engineer, Bethlehem Steel Co.*

o o o

T. A. LEWIS

EVER since heavy-duty gas engines found successful application as prime movers in the steel industry, no little amount of effort has been expended in developing a type of waste-heat boiler for the efficient utilization of sensible heat in the exhaust gases. So far as it is known, the first designs of waste-heat boilers for this purpose in the United States were made in 1918, but the apparent lack of gas-engine performance prevented serious consideration of their application. By 1935, the design had developed to such a point that the unit was reliable and coincidentally, gas engine performance had been improved to such an extent that the application was warranted. Before the year was over, Bethlehem Steel Co. had equipped one of its gas engines at the Bethlehem, Pa., plant with a waste-heat boiler unit. So successful was this installation that four complete units followed and, at the present time, three additional installations are now under construction.

Application of waste-heat boilers in industrial plants dates back to the past century. The early installations employed plain cylindrical drums, under which the flue gases were passed. Waste-heat boilers in open hearth furnaces have been used extensively in the United States since 1910. During the early stages the multi-pass water-tube boiler was favored, as it conformed to standard boiler practice and produced gratifying results. Later developments called for the fire tubular boiler which was more efficient and less costly in installation. This is now the favored type.

Application of a waste-heat boiler to a gas engine is simpler, less costly, and more effective than to a metallurgical furnace, because it obviates the necessity for auxiliary equipment such as fans.

No infiltration of air takes place as the boiler is on the pressure side, and clean gas and engine cylinder pulsations eliminate daily external cleaning of tubes.

Bethlehem gas engines, designed and made locally have been in operation since 1909. The first units were of the 4-cycle, double-acting, twin-cylinder type, driving 1500-kw. d.c. generators at 150 r.p.m. They were in service until 1927, when our power requirements no longer needed this large block of direct current power. The gas engine blowers have been in operation since 1909 and are still functioning. We have supplemented these older units with four 4-cycle, double-acting, two-crank tandem scavenged and super charged engines. With a 60-lb. m.e.p., they are rated at 5000 hp. or 3560 kw., for a 96 per cent electrical efficiency.

### Use Fire Tube Boilers

The improvement in the mechanical operation of the gas engine led to the development of a satisfactory type of waste-heat boiler. At Bethlehem it was first thought to install fire tubular boilers and economizers according to established European practice. As clean flue gases contribute to satisfactory operation, a final flue gas temperature of 350 deg. F. and a feed water temperature of 200 deg. F. were decided upon. By so doing, the use of the fire tube economizer was eliminated. Following the results obtained, a comprehensive study was made of various types of boilers.

The amount of steam which can be generated in a waste-heat boiler when supplied with a definite quantity of gas at a given temperature depends on the size of the boiler and the allowable draft lose. In practice, the theoretical limit of recovery is the heat in the gases between the temperature at which they leave the engine and the temperature of saturated steam at the desired operating pressure, or the temperature of the feed water if economizers are provided. It is not practicable, however, to build a boiler that even closely approaches this condition, but it is economically feasible to design a boiler with an efficiency up to 70 per cent if it is permissible to build up a draft loss of about 4 in. of water or higher through the boiler.

The flue gases enter the waste-heat boiler at 1200 deg. F. and leave at 350 deg. Further recovery, in the form of hot water, can be made from this flue temperature but local conditions determine whether such recovery is justifiable.

The following data for the first waste-heat boiler on engine blower No. 8, installed in 1935.

| | |
|---|---|
| Hours operated | 7,803 |
| Per cent of time operated | 89.2 |
| Average kw. generated/hr. | 3,480 |
| Average boiler hp./hr. | 398 |
| Average pounds of steam/kw. hr. | 3.45 |

During this period the engine operation was handicapped by lack of gas due to curtailed plant operations. Under normal conditions this unit operates on a 96 per cent basis.

### Larger Units Advised

For further improvements it will be necessary to go to larger units. As far as advantages are concerned, units of twice the present size are comparable with larger turbine units. In Europe there are gas engine units generating in excess of 7000 kw., and gas engine blowers delivering 135,000 cu. ft. of 15.6 lb. air per minute. Size for size they are more efficient than the present size units, because mechanical losses and losses through jacket water and radiation are smaller.

The Bethlehem gas engine that has been in operation for the past 20 years, but completely renovated, has been able to compete with the modern turbine units. Furthermore, application of waste-heat boilers has reduced operating cost to the extent where such a combination is the only logical one. As the size of the gas engine increases, the advantage becomes still greater. Compared with a turbine station, the gas engine waste-heat boiler system requires only half the amount of fuel for the same power output, releasing the remaining half for metallurgical furnaces.

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# Welding Economics and Application

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By E. W. P. SMITH
*Consulting Engineer, Lincoln Electric Co.*

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LOAD conditions do not in general exist in what might be termed the pure state but in most cases exist in fairly intricate matter and in some cases an exceedingly complicated matter. Tension, compression and bending seldom exist in a single state, but are generally combined in some manner usually characteristic of the service to be performed. No mention is made nor are the rates of application of the load suggested, however, merely by the mentioning of tension or compression. It is almost self-evident that in the case of the very slowly applied or steady load the conditions are very much different than they are when the load is applied very rapidly. The rate of application is one load condition which must be very thoroughly studied and considered in the application of welded design to any piece of equipment. There is also the frequency of the application of the load. Impact load is a very high rate of application, but

may be applied very infrequently. There is the relatively slow and rather infrequent application of the load such as exists in the case of a stamping press or bending brake. This frequency of application has a most decided bearing upon the characteristics of the design.

### Variations in Load

The variation of the load must also be taken into account, that is, from tension to compression or from a high tension to a lower tension, or from positive to negative bending or from positive to negative torsion. It has been found that when the load is very rapidly changed and the frequency is very high, or a great number of reversals occur, that the stress distribution becomes a factor which must be carefully studied.

All of these load conditions must be studied and the relation of the stress distribution in connection with this load must be given attention so that as uniform a stress as possible will be attained. It is obvious, of course, that if even the smallest section for a very small distance is stressed beyond the tensile limit, it will tear or break; that if even in the smallest section subjected to continued reversals, if the stress exceeds 32,000 lb. per sq. in. it will fail in a relatively short time. Welding fabrication permits uniformity of stress distribution and consequently the utilization of metal to the best possible advantage. This ability to perform and meet the service of load condition of weld metal must, of course, be done at a low cost.

These costs are made up of several different items — power or gas, the cost of electrode, the cost of labor, and the resultant quality or ability of the joint to meet load conditions. All of these must be taken into account when consideration is given to the item of total costs.

It is obvious, of course, that for arc welding large generators are more efficient than smaller generators. It is a characteristic of a welding motor-generator set that the efficiency curve is relatively flat. In the case of a 300-amp. unit, the efficiency may vary from 47 per cent at 110 amp., 25 volts, to 59 per cent at 370 amp., 38 volts. Consequently this wide range and high efficiency of the large generator means a lower cost for power.

### Larger Electrodes Preferred

At the normal rated current it is discovered that it takes from 75 to 90 sec. to consume an electrode. It is evident, therefore, that if larger size electrodes are used, more metal may be deposited and the lower the labor cost per lb. of deposited material. Just the change from 3/16 to ¼ in. electrode would involve a cost reduction of 25 to 35 per cent. However, just because an electrode is consumed in a certain time is no reason to believe that it is the most satisfactory. Variation in performance is of vital importance. To obtain a satisfactory joint, it is necessary that the metal be *deposited in the bead* and join the two parts involved. Therefore, the cost of fabrication should be considered on the basis of the amount of the metal *deposited*, not upon the cost per lb. of the electrode *purchased*.

In the fabrication of parts, as regards the matter of expansion and contraction, it is found that the use of a few number of beads has a tendency to reduce the distortion as compared to the amount of distortion obtained by using a greater number of smaller beads. This, of course, is an advantage obtained by the use of larger electrodes. It is also found that the use of the larger electrode results in the deposit of metal of higher ductility, the reason being the difference in the cooling rate obtained. Therefore, it would seem that in the matter of cost that the use of the larger electrode at high speed produces a deposit at a lower cost per pound, and of better quality. In general, the tendency is toward the use of too small electrode, and consequently high costs.

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# Factors Influencing the Selection of Insulated Cables for Steel Mills

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By F. L. AIME, R. B. STEINMETZ and S. J. ROSCH

*Insulated Products Development, Anaconda Wire & Cable Co.*

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IN a lengthy paper, the authors discuss in detail the relation of cable design to steel mill operating conditions, and conclude that greater dependability will be achieved by recognition of certain well-established principles and the establishment of approved practices, as follows:

1. Select cables of balanced design.
2. Proper and careful methods of installation and operation will prevent trouble and loss.
3. Choice of conductor size is based on voltage regulation, permissible energy losses and current-carrying capacity.
4. Current-carrying capacity of a cable is based on temperature rise and involves many factors, all of which should be considered.
5. Current-carrying capacity is affected by the kind of insulation used.
6. Lead-sheath or jackets for cables should be selected to fit operating requirements.
7. Duct runs, if not properly designed, will reduce the capacity of the cables therein.
8. Cable sheath grounding and bonding should be carried out according to good practice.

# The Fundamental Characteristics

**CHAPTER 21 of a Comprehensive Series on the Economics of Industrial Power Transmission.**

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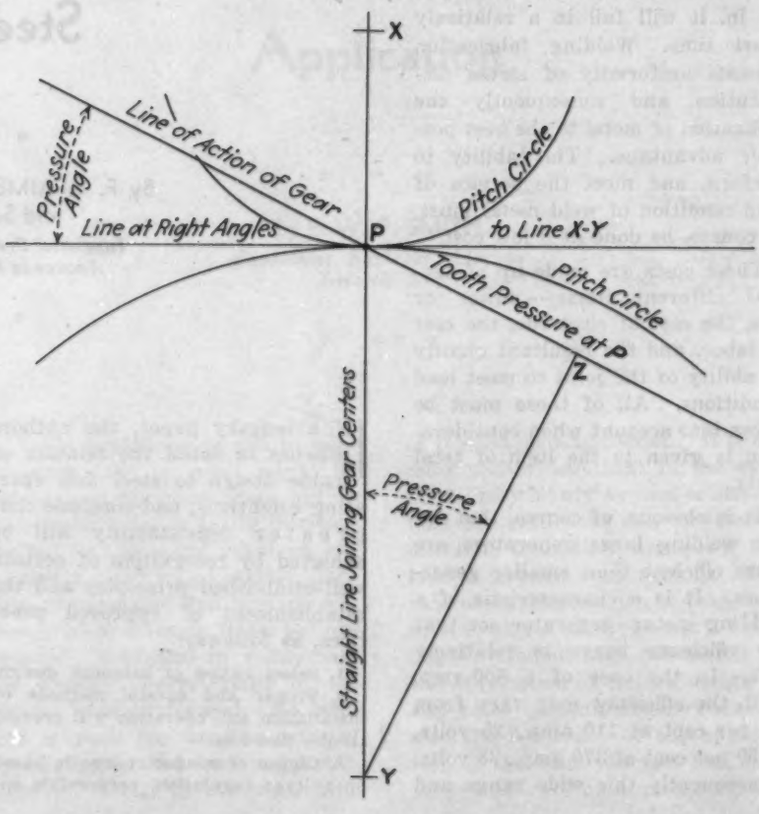
ENGINEERING libraries abound with textbooks on the subject of gears, but even a cursory examination of most of them discloses a curious fact; the contents are almost entirely exercises in applied geometry, and theories of design are so elaborate as to leave little room for discussions of practical limitations of use and of fundamental principles of application. As a result these books are positively forbidding to the lay reader, and few people other than designers and students ever consult them. Almost nothing is available in simple business English to tempt the management executive to find out anything about the economics of gear use.

Even the sales literature of most of the gear manufacturers starts with the assumption that the buyer knows *why* he wants to purchase a set of gears or a gear reducer, *what* general form of equipment is best adapted to his needs, and *how* the equipment should be installed to give the results he seeks. Thereafter these catalogs, bulletins and folders simply expound the merits of the materials used and the precision of the designs employed in the maker's equipment, and wind up with huge tables of ratings and ratios of the different models offered.

It is as though some staple were offered for sale in a grocery store, like sugar or salt or prunes or potatoes. Now, a single set of gears, ordered for the purpose of replacing a worn or broken set in some existing machine, may be considered to be a staple article of commerce, but gear reducer units (and particularly gear-motors) as made today in hundreds of different types and models and sizes, are certainly not staples, for their proper use requires skill, judgment and common sense. And it is of decided interest to note that, even in the case of the commonly accepted staples mentioned above, to be found in every grocery store in the land, smart merchandisers stimulate sales by means of books of recipes which tell the housewife how to make more and better use of these commodities, and why the more intelligent use of them results in better health for the family. The analogy is apt, and it would surely seem that a golden opportunity awaits the gear manufacturer who will remember that all his prospective customers are not gear engineers, and will set forth briefly the conditions under which his gears may be used to the best advantage and why one type is better for a certain job than another.

As a result of this situation the present discussion will prove to be



# of Gear Drives

By FRANCIS JURASCHEK
*Consulting Editor, The Iron Age*

very elementary to the engineer who knows gear design and has had experience in gear application work. But if it brings to the management executive who must approve the requisitions of his engineers for gear purchases, and pays the bills therefor, a clearer idea of the basic economics of the subject, no apologies will be needed. Two diagrams in applied geometry will be introduced, solely for the purpose of explaining a few technical terms used in every gear manufacturer's catalog. It is necessary to have a clear understanding of the meaning of these terms to use the tables found in such catalogs. Then the various types of gears will be described and their funamental characteristics explained. Finally, in a later article, the applications of these characteristics to particular situations will be discussed in an effort to show *why*, *how* and *where* the various available types may be used to best advantage.

## Gear Drives Are Positive Drives

A gear-drive is a loose-coupled positive drive, operating under conditions which a direct-coupling cannot meet. These conditions may be classified under two broad heads:

1. Both shafts do not lie in the same line. In this case the axes of the shafts may intersect, or not, but the drive in either event must "turn a corner." The speed of the driven shaft may be the same as, or greater or less than, the speed of the driving shaft.

2. Both shafts lie in the same line, or are parallel to each other, but the shaft speeds are different.

The use of a gear-drive is primarily indicated where space is at a premium (or where compactness of the drive mechanism is highly desirable), and where loads are either naturally fairly steady or where intermittent load fluctuations may be damped out by the use of a fly-wheel. A second major use of gearing is indicated where the ratio between the speeds of the two shafts must be high; that is, where a high driving speed is reduced to a low driven speed, or vice versa. A third use is indicated where it is necessary for the drive to turn a corner within limited space.

In general, all positive drives differ from resilient drives in the fact that the slip of one part upon another is either eliminated entirely in the positive drive, or is held at a negligible minimum. Resilient drives are purposely designed to permit slip in order to accommodate shock loads without damage. Positive drives contain elements which interlock with each other throughout the entire mechanism. This point is perhaps most clearly illustrated in a gear drive, where each gear is keyed to its own shaft, and the teeth of one gear meshes, or interlocks, with the teeth of the other gear. As a consequence, power is transmitted from one shaft to the other without the loss of a shaft revolution, since the interlocking of the teeth prevents slip.

At the same time it must be clearly understood that this interlocking effect, while positive, is not

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FIG. 1—The fundamental geometry of gear design.

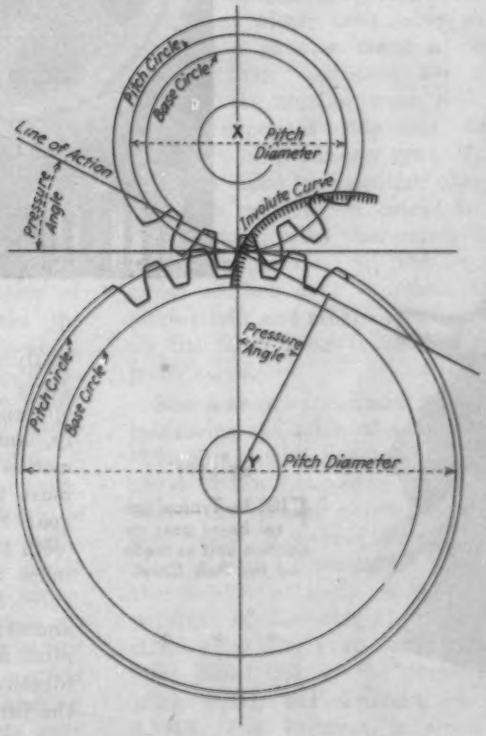


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FIG. 2—Applying the geometry of gear design.

*tight*. There must be a certain amount of "give" between the gears themselves, or the frictional resistance which would be encountered in the combined sliding and rolling action of one tooth upon another would be so great as to destroy the efficiency of the drive. Hence, since the gears are always so designed and installed as to permit a film of oil or grease to be interposed between the tooth surfaces in contact, a gear-drive is said to be "loose-coupled."

The advantages of gear drives are that, within limited space, power may be transmitted at high efficiency and with no loss of speed, in any direction and at any speed best adapted to the requirements of the driven machine. In particular, reduction gear units make it possible, in the smallest amount of space, to use standard motors and control equipment for any power application. Since progress in motor design advances along the lines of higher speeds and more compact units, while progress in industrial machinery design advances along the lines of more compact, self-contained and convenient equipment, gear-drives provide a natural and logical means of applying, within limited space, the most economical motor speeds at the exact speeds demanded by the machine for most efficient operation. With properly designed and installed gear reduction units higher speed motors may be used, permitting the application of smaller size motors of less weight and lower material cost, with a saving in equipment space, lower cost accessory equipment, reduced maintenance, higher mechanical efficiency, and (with induction motors) higher power factor.

## How Do Gears Work?

Two simple sketches in applied geometry will help materially to make clear the meanings of certain technical terms found throughout the literature of gear-drives. The essential terms are to be found here.

When two spur gears are in mesh, the circles which bound the outer edges of the teeth of each gear, overlap. Within this overlap, however, and on the straight line which joins the centers of the shafts on which the gears are mounted, there is a point where two imaginary circles drawn from those centers just touch each other. Those imaginary circles are called "pitch circles," and the point where they meet is called the "pitch point." The importance of the pitch circle lies in the fact that this is the line around which the teeth of the gear are equally spaced. Consequently one way of designating a particular gear is to measure the distance in inches around the pitch circle from the middle of one tooth to the middle of the next adjacent tooth. This gives the "circular pitch" of the gear teeth.

At the pitch point the line of action of the pressure between two opposing teeth in contact forms a certain angle with a line passing through *P* at right angles to the line joining the two gear centers. This angle is called the "pressure angle," and, according to a well-known geometrical theorem, it may be shown in a different way by the angle (equal in all respects) marked *P-Y-Z*, in Fig. 1.

Suppose we apply these lines and terms and angles to a specific but simple gear problem, as in Fig. 2. *X* and *Y* are parallel shafts to be connected by gears. Shaft *X* is to make two revolutions while shaft *Y* makes one; therefore the "ratio" is 1 to 2 (or 2 to 1, whichever way you look at it). Manifestly the size of the teeth in both gears must be the same if the opposing teeth are to mesh properly, and uniform transmission of motion is to be secured, and there must be twice as many teeth in gear *Y* as in gear *X*. By *size* of teeth here is meant simply the distance around the gear circumference from one whole tooth to another. In other words, the tooth pitch of the smaller gear must be identical with the tooth pitch of the larger gear, in order to mesh

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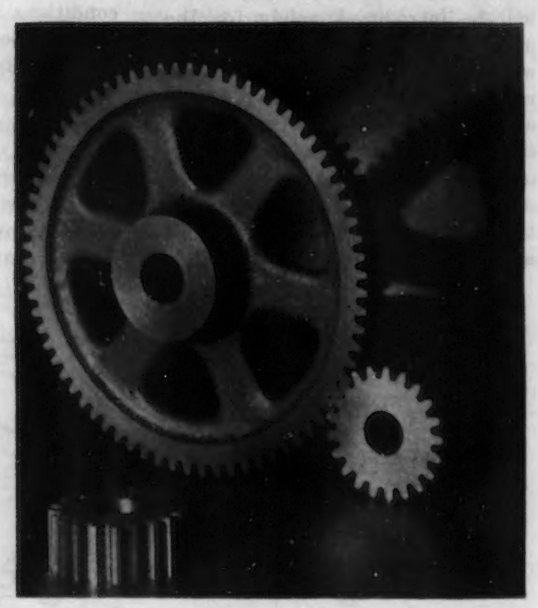
FIG. 4—A typical spur gear and pinions. Courtesy of Horsburgh & Scott Co.



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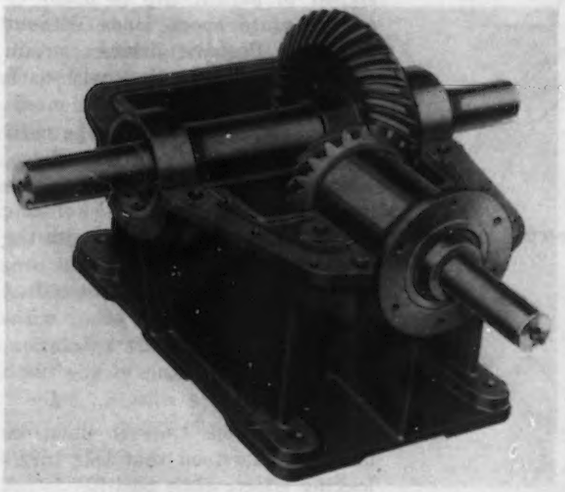

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FIG. 3—Typical spiral bevel gear reduction unit as made by the Falk Corp.

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smoothly. Since gear *X* is to turn twice while gear *Y* turns once, the diameter of the larger gear pitch circle must be exactly twice the diameter of the smaller gear pitch circle.

The form of the tooth has been investigated by many able mathematicians, and a law of tooth curvature determined. Many types of curves obey that law, but one curve has been found to be most practical. This curve is called the "involute." An involute may be traced by wrapping a string tightly around a cylinder, setting that cylinder end down on a sheet of paper, and with a pencil looped in the free end, unwinding the string from the cylinder. Involute curves for gear teeth are developed from "base circles." Within fairly wide limits, the diameters of base circles may be chosen arbitrarily, but, for any pair of gears, the respective base circle diameters *must* be in the same ratios as the pitch circles. And, the diameter of the base circle relative to the diameter of the pitch circle, determines the pressure angle. For many years a pressure angle of 14½ degrees has been preferred for involute teeth; today, however, a pressure angle of 20 degrees is widely used.

For involute curve gear-teeth, the actual shape of the tooth is determined by one of three methods of the use of the curve inside and outside of the pitch circle. When equal parts are used on both sides of this circle, it is known as the "equal addendum" method (the *addendum*, properly speaking is that portion of the whole gear tooth which lies *outside* the pitch circle, and the *dedendum*, that portion which lies *inside*). The second, or "unequal addendum" method is most widely used today, and provides a greater depth of addendum than dedendum for the teeth of the smaller gear, and a greater depth of dedendum than addendum on the larger gear. This seems to make for smoother operation in a majority of cases. In a third method, used only rarely for special situations, all the tooth curve on one gear is inside the pitch circle, and all the tooth curve on the other gear is outside the pitch circle.

There are two common ways of measuring the pitch of gear teeth. "Circular pitch" has been defined above as the *distance* in inches between two similar points on adjacent teeth, measured around the pitch circle. "Diametral pitch" is the *number* of teeth on the gear per inch of diameter of the pitch circle. For any gear the circular pitch multiplied by the diametral pitch equals the constant *pi*, or 3.1416. For instance, a circular pitch of 1 inch equals a diametral pitch of 3.1416; and a diametral pitch of 6 equals a circular pitch of 0.5236 inches.

These are all the fundamental technical terms used for spur gears, or gears in which the teeth are cut straight across the rim of the gear blank, parallel to the axis of the gear-shaft. For helical and herringbone, spiral and worm-gears, one other very necessary term is required; "Helix angle," or the angle made by the teeth of the gear with a line parallel to the gear axis.

One other factor should be mentioned at this time, however; the nature of the action which occurs when one gear-tooth makes contact with an opposing gear-tooth. This action is compound; it is partly rolling and partly sliding, no matter what the shape of the teeth or the type of the gear. The importance of this point lies in the fact that rolling action is practically free from friction, whereas sliding action causes friction and hence loss of efficiency. Hence the design of an efficient gear is largely a matter (once the ratios and the proper strength of materials have been determined) of finding opposing tooth shapes which will roll on each other as much as possible, with the least possible sliding action. In general, gears with parallel axes, and bevel gears with intersecting axes, produce less sliding action between contacting surfaces, in proportion to peripheral speeds, than other gear types. Such gears may be likened to the action in a ball bearing, where, whenever contact takes place at other than the pitch circles, there is always a slight rubbing effect present. It is inter-

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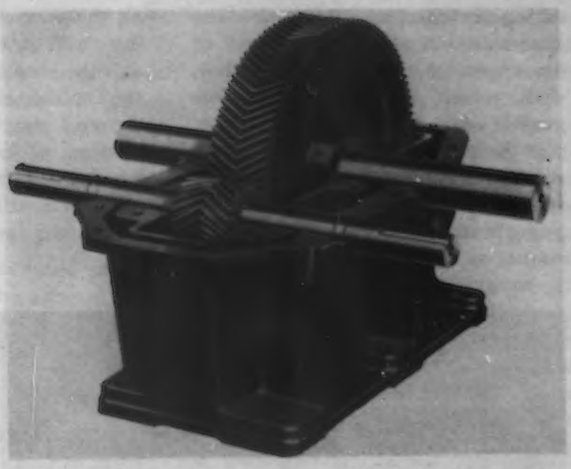
FIG. 6—Falk Corp. continuous-tooth herringbone gear reducer unit.



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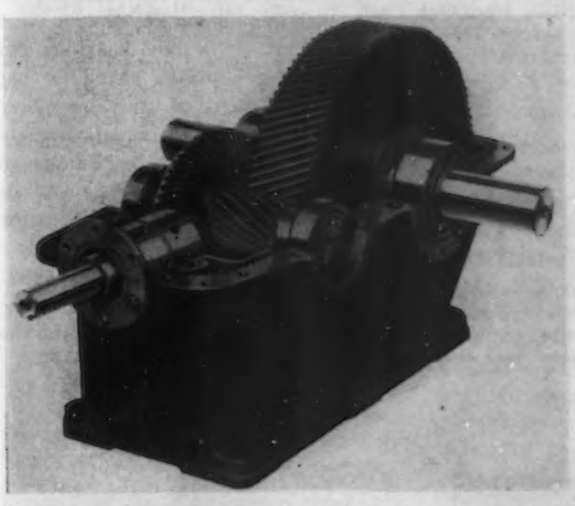

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FIG. 5—Falk Corp. helical gear reducer combined with bevel gear.

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esting to trace in imagination the successive stages of movement of one opposing gear tooth on another, and to see, especially when one gear is much larger than the other, just how the contact ranges from rolling to sliding, and back to rolling again, as the teeth meet, engage, and disengage. Except for the slight frictional losses occurring in the shaft bearings, here is where practically all the difference between power input and power output may be found.

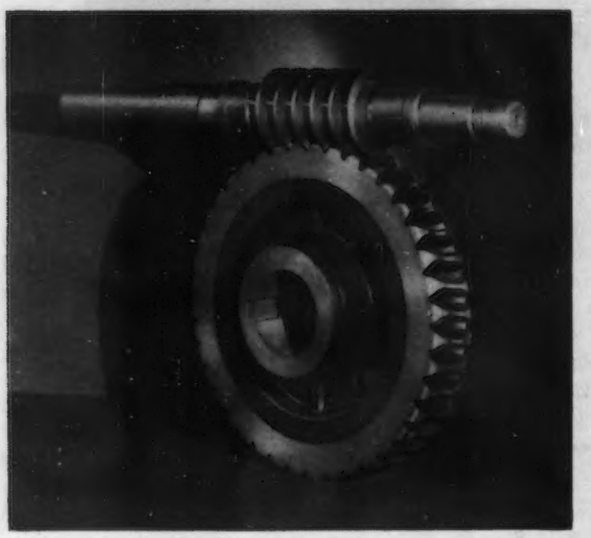

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FIG. 7—A typical worm and gear for a worm-gear reducer. Courtesy Horsburgh & Scott Co.

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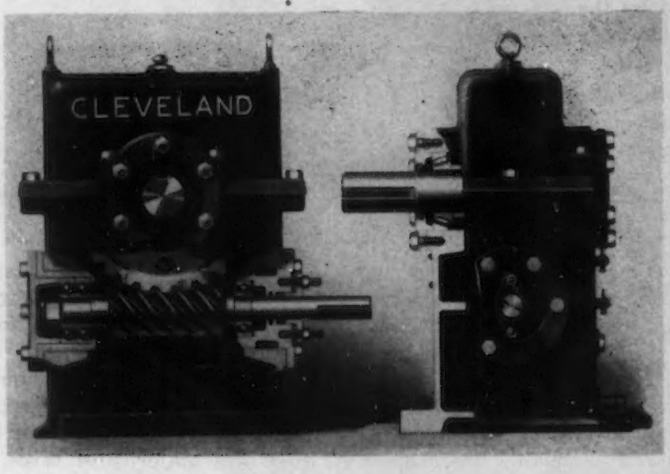
FIG. 8—Cleveland Worm Gear Co. single reduction worm gear unit.




## Types of Gears

The basic gear types are four in number:

*A. Bevel and miter gears.* Bevel gears are designed for the transmission of power at right angles, where it is desired to change the speed of operation. Two bevel gears of the same diameter and the same number of teeth (providing no change in speed of the shafts) are called miter gears. Bevel or miter gears designed to run at other than right angles are called angular gears. The teeth of all bevel gears may be cut in three ways: 1. Straight, along lines at all points radial to the gear shaft center; 2. Straight, along lines forming a helix angle with the radii (a helix is the line developed by wrapping a string around a cylinder, advancing the string equal spaces toward one end of the cylinder with each wrap); or, 3. Curved, along lines which usually spiral from centers equally spaced around the pitch circle. In all these cases the axis of the driving shaft intersects the axis of the driven shaft. A development of the spiral bevel gear called the "hypoid gear" permits the transmission of power between shafts which are offset; that is, with axes non-intersecting. This permits of a compact gear-housing in which the two shafts cross each other within the housing, and is of advantage in driving a battery of machines at right angles to the driving shaft, since the driving line shaft may be continuous, crossing each offset driven shaft in its housing.

*B. Spur and internal gears.* The distinguishing feature of a spur gear is the fact that the teeth are cut squarely across the outer rim of the gear in a direction parallel to the gear shaft axis. Consequently two spur gears in mesh require the corresponding gear-shafts to be parallel. An internal gear is a spur gear with the teeth cut across the inner rim of the gear. The larger of two spur gears is called, simply, the "gear"; the smaller, the "pinion." A train of spur gears may be so arranged that both the driving and driven shafts are in the same straight line. There are three possible ways to effect such a combination. For purposes of balance they are generally assembled in a three-point grouping as follows:

a. The plain spur-geared reducer. A pinion keyed to the driving shaft meshes simultaneously with three gears set at equal distances around it, each gear being keyed to a separate shaft set in fixed bearings and supporting a pinion keyed to that shaft. All three of these secondary pinions then mesh simultaneously with a gear keyed to the driven shaft set in the same line as, but not connected with, the driving shaft.

b. The planetary spur-geared reducer. The driving pinion meshes with three gears, as above, but the shafts on which these three gears are supported are mounted in a movable spider which is keyed to the driven shaft. The secondary gears mesh simultaneously with the teeth of a fixed, encircling internal gear. Thus, the turning of the driving pinion causes the secondary gears (or idlers) to revolve around it planet-wise, and within the internal gear. Since these idler gears are supported in the movable spider, their planet-motion causes the driven shaft to which this spider is fixed, to turn.

c. The non-planetary spur-geared reducer. The three sec-

ondary gears, as above, are held by fixed-position shafts, and therefore cannot revolve planet-wise; but the encircling internal gear is not fixed and is therefore free to revolve. Being attached by a spider to the driven shaft, the turning of the internal gear causes the driven shaft to revolve.

*C. Helical and herringbone gears.* The teeth of helical gears are cut across the outer rim of a gear blank at what is called a "helix angle"; like the thread of a screw. A herringbone gear is simply a double helical gear of opposite helix angles; each double tooth taking one-half the rim of the gear for one angle, and the other half of the rim for the other angle. If both angles meet in the middle of the rim, the tooth form is continuous; if they do not meet a narrow slot is left clear around the middle of the gear rim. In a pair of single helical gears there is definite end thrust caused by the tendency of the teeth of one gear to slide along the teeth of the opposed gear along the helix angle. In a herringbone gear this end thrust is neutralized, or balanced by the opposed helix angles of each gear meeting the opposed helix angles of the other gear.

Helical gears may be used to connect parallel shafts, or shafts at any angle and not intersecting. Double-helical or herringbone gears may be used to connect parallel shafts only. Combinations of two sets of helical or herringbone gears make it possible to place the driven shaft in the same line as the driving shaft. Both helical and herringbone gears perform the same functions as spur gears, but possess certain advantages as compared to them:

1. Size for size they have greater strength, as there are more teeth in mesh at any one time, and a larger amount of tooth area is in mesh constantly, permitting a wider distribution of the total load.

2. They are quieter and smoother in operation because of the above, and the clashing effect of sudden shock loads is minimized because it is more widely distributed.

Helical gears driving non-intersecting shafts at an angle are adapted for light and medium duty service only; for heavy duty service a worm-gear drive is to be preferred.

*D. Worm gears.* A worm gear combines a screw, or "worm" cut on the outer surface of one shaft, with a spiral gear mounted on a shaft at right angles to the worm shaft. This is a special case of the right-angled spiral gear drive. It provides a high ratio of reduction within a very small space. There are two essential factors in a successful worm gear drive: 1. The use of a high helix angle in the gear, and, 2, A worm of small diameter with a comparatively low peripheral speed. The action of the worm in contact with the gear is mostly sliding. It is like a screw entering a block of wood, except that since the block is not fixed, it advances as the screw thread advances, and thus translates a revolving motion of the screw into another revolving motion at right angles thereto. There is, at the same time, some rolling motion of the two thread surfaces, since both worm and gear turn simultaneously. It is the sliding action that consumes the most power in friction, however, and the design of the contacting parts must therefore be such that the largest amount of power will be transmitted with the least frictional loss. Tooth shapes are consequently of the highest importance, and an enormous amount of study has been devoted to the development of a gear tooth and a worm thread which, along the lines of contact will roll as much as possible and minimize the sliding action. Bronze is generally used for the gear because of its anti-friction qualities; this factor usually being of more importance than the strength of the gear. High-carbon, or case-hardened steel is used for the worm (generally made integral with the worm shaft) as here an extremely hard and unyielding, smoothly-finished material of great strength is needed.

Worm speeds up to 6000 r.p.m. are possible, but above 2000 r.p.m. the reduction unit must be water-cooled because of the high operating temperatures generated. Worm gear reduction units are adaptable to almost any form of power prime-mover; electric motor, steam turbine or internal combustion engine. Like other types of gear units they may be used in the simple single reduction form, or in compound reductions involving two or more sets of driving and driven gears.

***(In a succeeding article the relative advantages of each type of gear drive will be discussed, in connection with the problems of how, why and where to use them).***

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# Carnegie-Illinois' New Bridge Flooring

THE Carnegie-Illinois Steel Corp., Pittsburgh and Chicago, has placed on the market a new type of bridge flooring to be known as U. S. S. I-Beam-Lok open floor. The floor is similar to that marketed under the name U. S. S. I-Beam-Lok floor. It consists of special, extra depth 5-in. beams which form the elementary load-carrying members. These beams are spaced 6-in. centers, with carrying 1¼-in. by ½-in. cross bars intersecting at 3-in. intervals.

These in turn are notched at the top to receive two additional cross bars ¾-in. by ¼-in. spaced equally between the main carrying beams. The entire assembly produces a steel surface with rectangular openings approximately 1⅝-in. by 2¾-in.

This type of flooring is recommended by the company for vertical lift or bascule bridges on account of its light weight, and it is also said to be readily adapted to bridges having railway tracks in the roadway.

# What Is the Machine Doing for Your Community?

By JOHN H. VAN DEVENTER

IT is a double pleasure to be with you tonight.* First, because of the friendship which we of THE IRON AGE feel for this splendid industrial community, and second, because I am going to talk to you on a subject which I believe will have mutual interest.

We live in what is known as the machine age. As you know, the machine has come in for a great deal of publicity during the last few years of our national questioning of economics. Some of this publicity has been rather unfavorable and would lead us to believe that the machine would eventually result in hardship both to the community and to the individuals composing it. I am going to explore this question with you tonight to see if after a fair presentation of facts we can accept the machine as a friend or an enemy of community interest.

In using the word community I am employing the sense in which it depicts a group having more or less unified interests, such as you have here in this industrial valley, rather than in its broad sense as representing our national social structure. I do this for the reason that in our national economy the whole is represented by its parts and, therefore, what the machine means to your community as a typical industrial area, it will mean to America as a whole.

If you travel about the world or even the confines of the United States you will find communities that vary exceedingly in their characteristics. In one place you will say "this is a fine community." In another you will say, "please let me know the time of departure of the next train, for I do not like this place."

What is the reason for this distinction between communities? I think it is primarily a difference between the people in them. The community reflects the people composing it. If the people of a community are intelligent, alert, energetic, and of good character, you will find a first-class community, which reflects success and prosperity, provided certain other conditions are present. If you encounter a community in which you have shiftlessness, a low average mentality, and a poor level of character and ambition, you are going to have a poor community, regardless of the other conditions of which I speak.

You will have noted that I have put a proviso into these cases as to certain other conditions. These conditions have to do with opportunity for the *profitable* exercise of the virtues of character or intellect which are possessed by the superior community. Without these opportunities we might have a community of artists, philosophers and poets living upon a high intellectual plane and possibly not objecting to missing a few meals now and then because of the lack of the wherewithal with which to obtain them. But, without these opportunities, you will not have communities of comfortable homes, excellent sanitation, with superior educational and recreational facilities, and properly run as to police, fire protection and adjudication of laws.

In our modern industrial economy, to have all of these things we must have, first, the profitable opportunity for employment for members of the community. This is where the machine comes into the picture.

To give you a proper background for the entry of our principal character of mechanization, I must take you back to the Garden of Eden where we were first shifted from an agrarian to an industrial economy.

As you all know Adam was not

(CONTINUED ON PAGE 119)

* Address given on Sept. 27 before the Ellwood City, Pa., Chamber of Commerce and regional industrial and business organizations.

# New Furnaces Give Steel Makers Better Production Control

TO meet an increased demand for product quality, new furnace equipment is appearing in the steel mills which specialize in such work. An illustration is the Columbia Tool Steel Co., Chicago Heights, Ill., which a year ago completed a changeover to all-gas, all-controlled temperature and atmosphere heating, and has now completed the installation of three additional entirely new gas-designed ingot and billet heating furnaces. The decision to take this step, according to Arthur T. Clarage, president, arose from the improved results which the company experienced after converting its old furnaces to the use of gas a year ago. The new furnaces were designed and installed by the Mahr Mfg. Co., Minneapolis, installer of the original conversion equipment.

During the short time they have been in operation, the new furnaces, which serve 8000-lb., 3500-lb., and 750-lb. steam forging hammers, are said to have shown an added improvement in performance, including further reduction in scale and in the control of surface decarburization, resulting in a greater net return a pound of material processed. In addition, speed of heating plus accuracy of temperature control, which has come to be taken for granted in installations of this type, has further improved the quality of the finished work. The new furnaces embody improvements in combustion chamber design, and in the application of burners and controls which are the fruit of additional research, together with experience from the original conversion jobs. Further research by Robert G. Guthrie, chief metallurgist, Peoples Gas Light & Coke Co., Chicago, and his associate, Dr. Oscar J. Wilbor, who designed the original conversion installation, has resulted in improvements in design of the furnace and related equipment.

## Accuracy of Combustion Control

The research was directed chiefly to the problem of complete combustion control—in other words, the achievement of a heating flame of definite characteristics, the products of which have proved to be most desirable for this type of heating. It is claimed that the operation of these new furnaces has resulted in a closer approach to perfection in this respect than has been achieved in any known similar installations.

Accuracy of combustion control has been made possible by two factors—the availability of a supply of natural gas of uniform heating value, and the combustion of this gas, at positive pressures, with a uniform and predetermined air supply. This practice results in the entire elimination of variables in the combustion equation.

The new furnaces are of the conventional box type, with a special combustion chamber and a special arrangement of burners and vents. A steel underframe resting on but not fixed to a concrete slab permits expansion and contraction and transmits a minimum of ground shocks to the furnace proper. This construction is expected to contribute substantially to longer furnace life and to reduce repairs to the refractories.

Although the overall dimensions run up to 26 ft. long x 12 ft. deep, the furnaces are so designed that they can be jacked up on rollers and moved to new locations should plant practice make this desirable. Having no stacks, and being connected only to gas and air lines and to control instruments which are easily moved, these furnaces are truly portable.

The furnaces have heating chambers up to 7 ft. deep and approximately 16-ft. long, with the height of door openings arranged to suit the various sizes of work to be heated. They are lined with the new increased alumina super-refractory fire brick backed with light weight insulating brick.

## Foreman Determines Heating Program

In use, the heating program is an exact schedule determined by the job foreman. By means of a program slate, the foreman indicates his instructions for the 24-hr. shifts. A recording pyrometer shows whether these instructions have been followed, and, likewise, continuous gas analysis apparatus shows whether or not desired combustion has been maintained.

Further reduction in gas consumption has followed the improve-

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THE new furnaces installed by Columbia Tool Steel Co. embody improvements in combustion chamber design and in the application of burners and controls which are the fruit of additional research.

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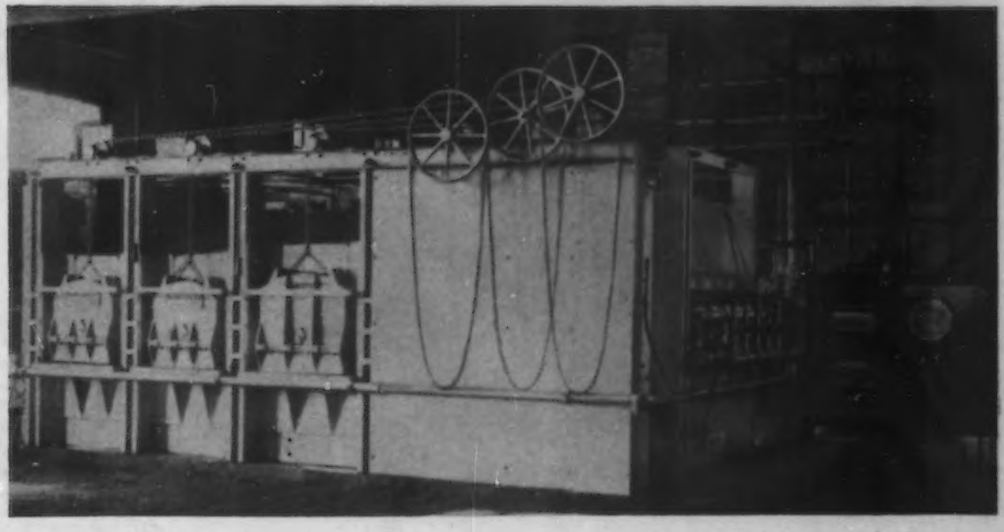
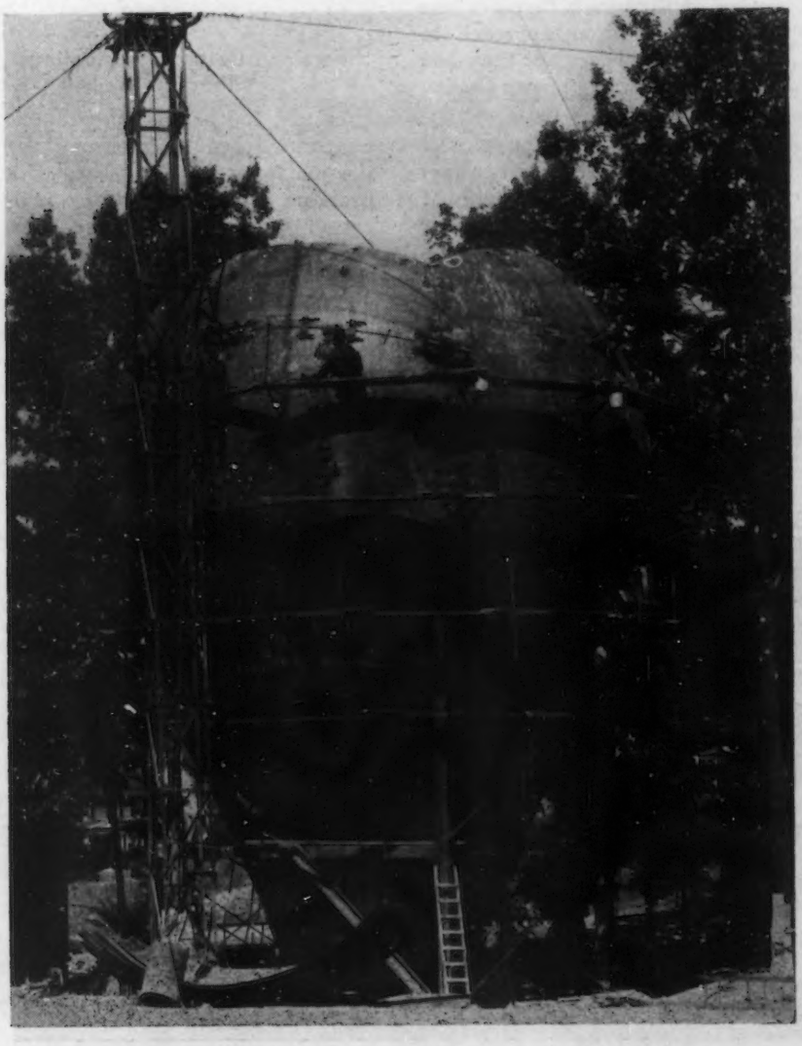


# Steel "Pear" Built by Scientific

THE Carnegie Institution in Washington is having welded a hollow steel "pear," weighing 70 tons and standing 55 ft. high, to find out what makes the universe tick. This is really the underlying purpose of the institution, because the unique structure will be used to make studies of the primary forces which bind together the commonest parts of atoms. And, as scientists at the institution point out, the forces which hold the particles of the atom together are the forces which have built the universe and keep it running.



STEEL pressure vessel in construction by Chicago Bridge & Iron Co., for atomic physics observatory of Department of Terrestrial Magnetism of Carnegie Institution in Washington. At greatest diameter "pear" is 37½ ft. It is 55 ft. high.

The structure, made of a series of plates mounted in ring form, is called a "pear" by the workmen because it is shaped like that succulent fruit. "Tower" and "egg" are other terms they use. It also has been likened to a buoy and to a balloon. And the imaginative yet realistic little son of one of the scientists said it looks like an ice cream cone.

Nearing completion, the "pear" of steel plates, ranging from ½ in. to 0.91 in. in thickness, is being fabricated and erected by the Chicago Bridge & Iron Co., for the Carnegie Institution's Department of Terrestrial Magnetism on Broad Branch Road in Washington, and of which Dr. John A. Fleming is director. In charge of the atomic physics section is Dr. M. A. Tuve, whose associates are Dr. L. R. Hafstad and Dr. N. P. Heydenburg. The new super-voltage equipment, of which this pressure-shell is an essential part, was designed last year by Dr. Fleming and his staff. Similar but smaller equipments, patterned after the Department of Terrestrial Magnetism designs, are being erected at the East Pittsburgh, Pa., research laboratory of the Westinghouse Electric & Mfg Co., and at the University of Minnesota, un-

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# Institution to Find What Keeps Universe Running

der the direction of a former Carnegie man at each place.

### A New Way of Smashing Atoms

The "pear" is built on a reinforced-concrete substructure 18 ft. in diameter and 20 ft. underground, where the observing apparatus for these atom-smashing studies will be located. Smashing atoms is not new. But the set-up now under way is. Equipment inside the sphere will include a large electro-static generator and an associated high-vacuum tube, like a giant X-ray tube, both insulated by the compressed air in the tank (50-lb. gage) for potentials above 5,000,000 volts.

In the erection four steel columns were attached to anchor bolts in the foundation with assembled horizontal struts tacked to the columns. Diagonal steel rods were installed permanently. In faces having no rods, cable twisters were temporarily used to plumb the columns. Next No. 6 plates, 0.91 in. thick, were erected and keyed to the columns, while two sets of spider rods were installed to round up this ring. Erectors then went over the tower, plumbing and squaring it with the diagonal rods and cable twisters, after which they put in the permanent diagonal struts. Then followed welding of the vertical seams of the No. 6 plates. No. 5 plates, 0.77 in. thick, were then hung from No. 6 ring and assembled with key equipment and spider rods installed in No. 5 keyed and fitted to No. 6. Following the same method, Nos. 4, 3, 2, and 1 rings were installed. No. 4 is 0.64 in. and the other rings each ½ in. thick. Rings above No. 6 each ½ in. thick, form the spherical portion, while the conical portion of the "pear" has walls ½ in., 0.64 in., 0.77 in., and 0.91 in. in thickness.

After assembling the rings and installing spider rods, welding was

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AERIAL view of interior, showing method of construction by use of spider rods to make central supporting ring perfectly circular.

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ANOTHER aerial view of interior showing particular sections in place prior to welding. Note that two lower horizontal seams have been welded while the upper joint has not yet been welded.

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begun on portions of the "pear" which had been erected. Vertical seams of each ring were welded before the girth seams of the same rings. This completed the work on the conical section.

## Method of Assembly

Reaching the side faces of the spherical section, erection was begun with plates with a temporary stiffener channel; stiffeners occurred on alternate plates. Side face plates were assembled to each other and to No. 6 plates with key equipment. Then all seams that could be reached from the second course of brackets above No. 6 plates were completely welded. After this operation all spider rods were removed from inside the "pear," followed by erection of the lower main platform in No. 2 ring. The 19-ft. spherical "corona cap," which is the high-voltage terminal mounted on porcelain columns inside the "pear," was then erected outside the tank and lowered through the opening at the top.

All welding is tested by cutting out "coupons," which are small plugs 1 in. in diameter cut out of each seam. These specimens are examined by the welding inspector to insure a perfect weld, and all welding is chipped and ground thoroughly smooth, it was explained, so as not to detour the enormous voltage from its intended purpose of sending a beam down the giant vacuum tube. So neat is the job at the hands of the skilled craftsmen, working on false scaffolding, that it looks like a balloon fabricated with invisible stitches by an expert seamstress. It will be further beautified with an exterior coat of aluminum paint.

Giving the scientific twist, Dr. Fleming and his associates call the "pear" an "atomic physics observatory." In the first place, Dr. Fleming explained, it will look very much like an astronomical observatory. More important, he said, it is an observatory in every sense of the word.

"We are studying objects here which are just as far away from ordinary dimensions on the small side as Hubble's spiral nebulae, observed at the Mt. Wilson Observatory, are on the large side," said Dr. Fleming (the Mt. Wilson Observatory is another Department of the Carnegie Institution of Washington).

Experiments are to begin by flowing a stream of hydrogen or heavy hydrogen through a glow-discharge at the top of the X-ray tube which will be charged up to 5,000,000 volts by a moving belt. These hydrogen atoms, travelling at about one-tenth of the speed of light, and gathering energy en route, will be sent down through the vertical tube to the targets at the end of the tube in the underground room where the physicists' instruments will be located. Impact against a target will shatter the atoms. Alpha rays, X-rays, gamma rays, and neutron rays, said Dr. Tuve, are produced when atoms of the target undergo transmutations (alchemy) under bombardment by ordinary hydrogen ions (protons) and by heavy hydrogen ions (deuterons). Because of dangers to the observers, the measurements will be carried out in an auxiliary observation room, also underground. Running from this chamber and the front room under the "pear" to the laboratory nearby is a circuitous tunnel, to give protection against scattered rays.

The lower half of the "pear" will be encircled by a brick wall, which will give the whole structure an attractive architectural design, and in color will match the surrounding buildings.

# Steel Coking Drums, Too Large for Usual Shipment, Floated 1371 Miles

ONE of the strangest freight shipments ever made in the United States recently started on a 1371-mile journey from the M. W. Kellogg Co's plant in Jersey City, N. J., to Whiting, Ind. It consisted of four coking drums too large for shipment by rail, steamer or barge. A careful check-up of bridge clearances, channel depths, etc., proved the feasibility of launching the drums into New York Bay at Jersey City and towing them to Whiting by way of the Hudson River, the New York State Barge Canal, up Lake Erie to Detroit and on through Lake Huron into Lake Michigan to Whiting.

As each drum was 60 ft. long and 16 ft. in diameter, and weighed 175,000 lb., it was necessary to load them on special flat cars at the Kellogg plant for transfer to New York Bay, where they were lowered into the water by a floating derrick. The large diameter of the drums not only necessitated the entire suspension of all other railroad traffic while they were in transit from plant to dock, but it was also necessary to build special tracks within the plant and to cut special doors in the walls to permit their egress.

In the water the drums were lashed together in pairs with strong steel cables and were protected from contact damage by heavy timbers securely fastened lengthwise. The manholes and all extending projections were also protected by boxes of heavy lumber bolted securely in place. For the trip up the Hudson River and through the three Great Lakes one large, ocean-going tug handled the tow but in the canals and more congested waters the services of another tug were provided to prevent accidents.

### Tower to Be Shipped in Same Manner

The shipment of the four coking drums served as a dress rehearsal for the transfer of a mammoth low pressure evaporator tower which is to be shipped by the Kellogg company to Whiting about Oct. 15. This tower, as far as the company knows, is the biggest and the heaviest single piece of freight ever shipped. It is 80 ft. long, 15 ft. in diameter, has walls 2 5/16 in. thick and weighs 460,000 lb. It also will be towed to its destination, but because of its extreme size and the fact that there is not sufficient depth of water in the Erie Canal between Syracuse and Buffalo to permit its passage, it will have to proceed through the New York State Barge Canal to Oswego on Lake Ontario and thence through Lake Ontario and through the Welland Canal into Lake Erie and Lake Huron into Lake Michigan to Whiting, a distance of 1371 miles.

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# 49,327 Freight Cars Installed to Sept. 1

NEW freight cars installed in service by the Class I railroads in the first eight months this year totaled 49,327, the largest number for any corresponding period since 1930, the Association of American Railroads has announced. New freight cars put in service in the first eight months of 1930 totaled 64,418.

Class I railroads in the eight months of 1937 also installed 226 new steam locomotives and 38 new electric and diesel locomotives, the number of new steam locomotives put in service being greater than for any corresponding period since 1930.

New freight cars on order on Sept. 1, this year, totaled 31,419, compared with 22,254 on Sept. 1, last year, and 7240 on Sep. 1, 1935.

New steam locomotives on order on Sept. 1, this year totaled 252, compared with 43 on the same date one year ago, and nine on the same date two years ago. New electric and diesel locomotives on order on Sept. 1, this year, totaled 37, compared with 17 last year and three, two years ago.

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STEEL tanks fabricated by M. W. Kellogg Co., Jersey City, N. J., being lashed together for their long water trip to Whiting, Ind.

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# THIS WEEK ON THE ASSEMBLY LINE

*. . . Auto industry's executives see no cause for gloom although labor situation generates fears.*

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*. . . Production speeding toward 375,000 mark this month and volume orders for materials are expected soon.*

o o o

*. . . Industrial hygiene forum and UAW medical expert agree that lead poisoning cases are fewer.*

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*. . . Minor labor troubles and UAW feud threaten dangerous flare-up at industry's expense; CIO loses gas workers' vote.*

DETROIT, Oct. 4.—With the beginning of the fourth quarter, observers of the automobile industry and those actually connected with it are taking stock. From the purchasing directors of the most important automobile producers and from general executives in these same companies, there is an off-the-record reflection of honest-to-goodness optimism, even though tempered by some fears generated by the labor outlook. It is claimed on all sides that there is no justification for the pessimism that has been attached to the small volume of steel orders coming out so far from the automobile company offices.

Probably the explanation lies to a large degree in the fact that all the automobile company publicity departments start out the year talking in terms of millions of cars and weekly production for each unit of their company of ten, twenty or thirty thousand cars. They overlook the fact that the last week, in many cases, saw assembly lines operating at one-fifth to one-third of capacity. This is normal, in view of the fact that 100 per cent accuracy in setting up assembly lines cannot be attained overnight. It seems to be certain that between the first and fifteenth of this month most of the automobile company steel buyers, and purchasing departments as a whole, will be showing much more activity. In fact, parts and accessory producers are already operating under high pressure, anticipating the needs of the assembly lines two or three weeks from now.

Plymouth, for instance, expected to produce about 2000 to 2500 cars in its first week after resuming operations and allowed itself two weeks to get to "near capacity" operation. So even if schedules run smoothly, this unit will be in its third week of production before it really hits its stride.

### Output Is Increasing

Automobile production is already attaining a good volume and rose sharply last week, despite the fact that two of the largest volume producers, Ford and Chevrolet, have not started assembling new models. Output was almost double the corresponding week of a year ago. According to Ward's Automotive Reports, last week's production was 45,830 passenger cars and trucks in the United States and Canada, compared with 28,030 the preceding week and 23,175 in the corresponding week of 1936. Chrysler led the field, producing 16,550 units compared with 3775 a week earlier.

Although figures have not been completely compiled, indications are that September car and truck production totaled 185,000 units. This is a remarkable showing for the final month of a production year and is more than 32 per cent above last September. Ward's, which at the start of the month estimated production within 5000 units of the final figure, places October's output at about 375,000, which would be a gain of 63 per cent over the 229,989 units built last October.

This figure, 375,000, is by no means merely an optimistic guess. As mentioned a few paragraphs back, parts plants are feeling the pressure that assembly units will feel before the month is over.

An important factor in 1937 success, according to Alfred Reeves of the Automobile Manufacturers' Association, has been the increased demand from foreign countries. "Whereas automobile production this year represents an increase of only 11 per cent over 1936, export sales are exceeding last year by more than 30 per cent. At this rate 1937 sales of American designed motor vehicles in 140 countries outside the United States may be expected to reach 650,000 units."

This ties in with word from Packard's export man, B. C. Budd, vice-president. He said that exports of 1937 Packards would be well over double those of the 1936 model year. About 8 per cent of Packard's United States production is exported, reaching more than 100 foreign markets.

Reeves, speaking of the replacement market, declared that probably not more than half of the 28,000,000 motor vehicles operating in the United States have four-wheel brakes, safety glass or any of the other necessary features of a modern motor car. The 1937 calendar year should see more than 5,000,000 cars turned out, he declared, passing the 5,000,000 mark for the second time in history.

### Homer Martin Victim of Nerves

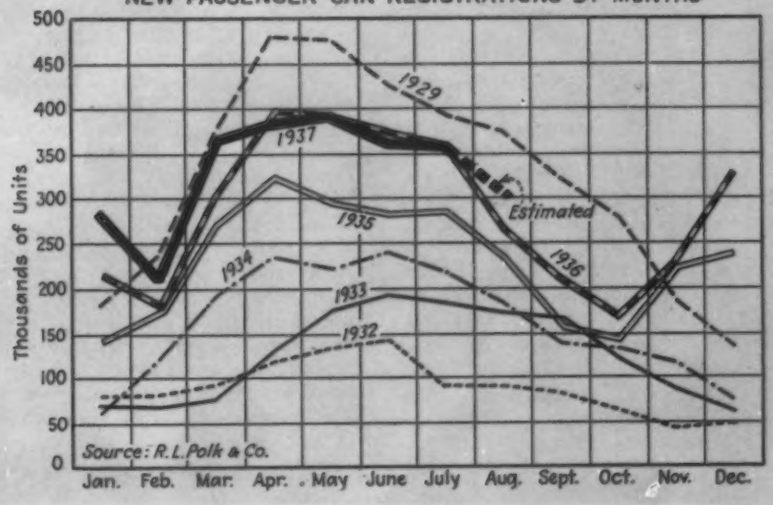
An apparent victim of a bad case of nerves is Homer Martin, president of the UAW International Union, who greeted visitors at the door of his hotel room last week with a pistol in his hand. It was an anti-climax to Martin's first attempt publicly to play the role of a dictator. A large number of the self-styled pickets in his hotel were the victims of the "purge" which Martin staged earlier in the week. Others among the pickets were there to find out if he would authorize a strike vote by employees of the Ternstedt Mfg. Co., a division of General Motors. Others represented the Timken-Detroit Axle local of the union and various other units such as Kelsey-Hayes, Yale & Towne, Fleetwood, Cadillac and Plymouth unions and Flint and Pontiac groups.

The Flint situation, incidentally, amounts to an open revolt against Martin's authority and few would be surprised at a strike move in that locality sponsored by Martin's opponents who have considerable strength there. In large part, this fear of internal union warfare is having its effect on the attitude of industrial leaders in this area. It is conceded that whatever the outcome of UAW negotiations with General Motors and Chrysler, there still would be great danger of a serious tie-up if the union factions decide to involve the general membership in the battle for power.

Police still are guarding a six-block area near the plant of the Mueller Brass Co. at Port Huron, Mich., following a battle between CIO pickets and AFL men who wanted to go back to work in the plant. Fred L. Riggin, president of the company, is earnestly seeking a solution to the problems brought up by the CIO-AFL battle at the gates of the plant earlier in the week. "No snap judgment will be made by the company, neither will it be forced into any rash commitments," Riggin said, referring to the claims of the two unions to the right of representing employees in negotiations.

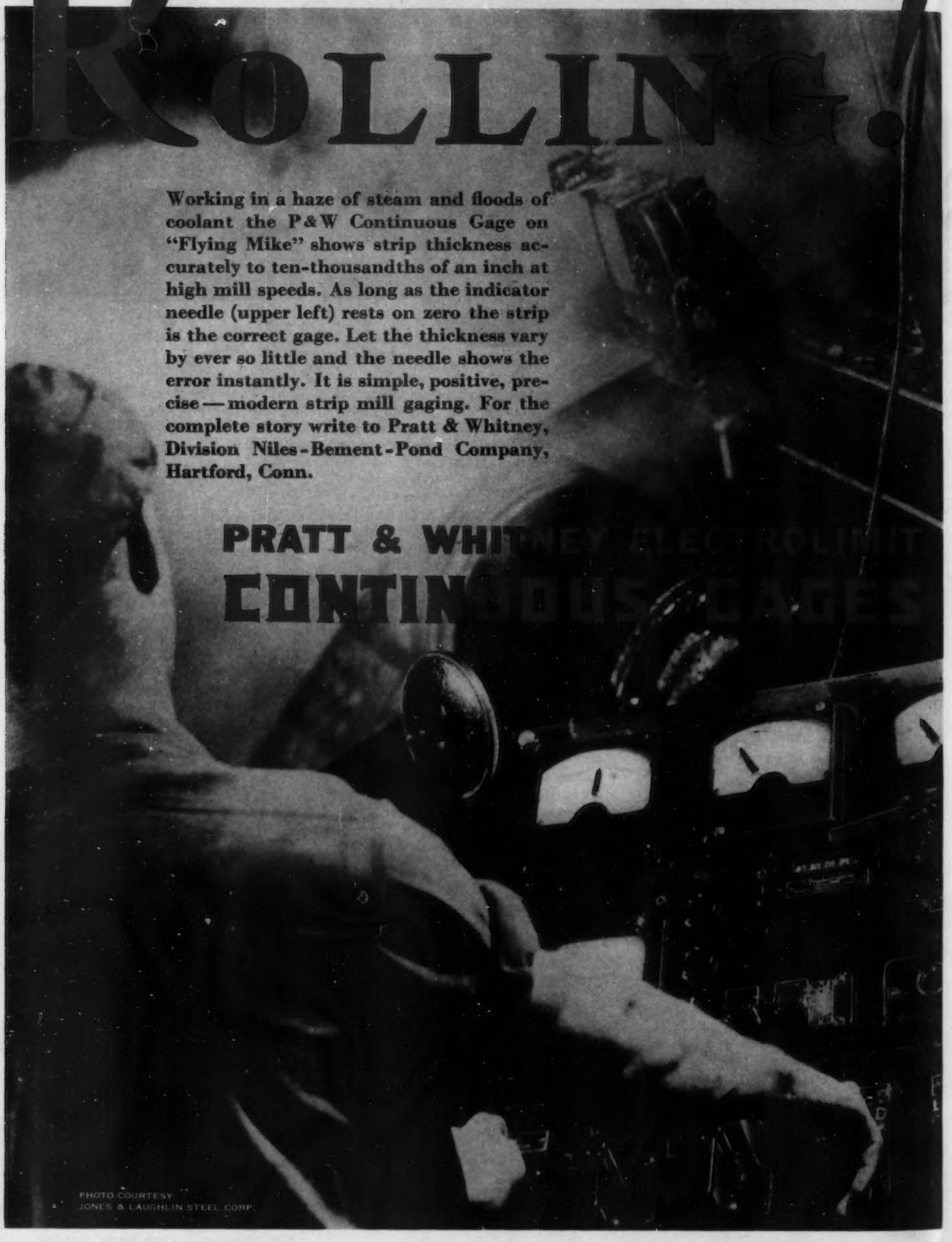
The Gas & By-Products Coke Workers' Union, a CIO affiliate, was the loser by more than two-to-

NEW PASSENGER CAR REGISTRATIONS BY MONTHS



# Strip thickness controlled to "tenths" at 1100 ft. a minute

# ROLLING!




**Working in a haze of steam and floods of coolant the P&W Continuous Gage on "Flying Mike" shows strip thickness accurately to ten-thousandths of an inch at high mill speeds. As long as the indicator needle (upper left) rests on zero the strip is the correct gage. Let the thickness vary by ever so little and the needle shows the error instantly. It is simple, positive, precise — modern strip mill gaging. For the complete story write to Pratt & Whitney, Division Niles-Bement-Pond Company, Hartford, Conn.**

one in balloting last week to elect sole bargaining agent for negotiations with the Detroit City Gas Co. The workers cast 1052 votes for a coalition, the American Labor League and Employees' Association. While charges of fraud in the balloting were hinted by representatives of the losers, it is now believed that there is little possibility of a strike involving this important utility.

Having tried every other field, the CIO is preparing to launch a drive to organize engineers and technicians in this automotive area and has even attempted to get the cooperation of various professional societies, but without luck. There are, of course, several minor groups which have labor organizations among engineering and technical workers, including the Society of Designing Engineers, which has attained a fairly strong membership in automobile body drafting plants.

### Exaggerated Reports of Occupational Ills

Figures that have been used in discussions of occupational ills were attacked last week in Detroit when members of the Industrial Safety Council's supervisor's division heard three of the city's leading industrial medical men. The session followed by a few days the publication of a statement by the new Medical Institute of the United Auto Workers' Union on the subject of occupational skin diseases and "speed-up" neurosis.

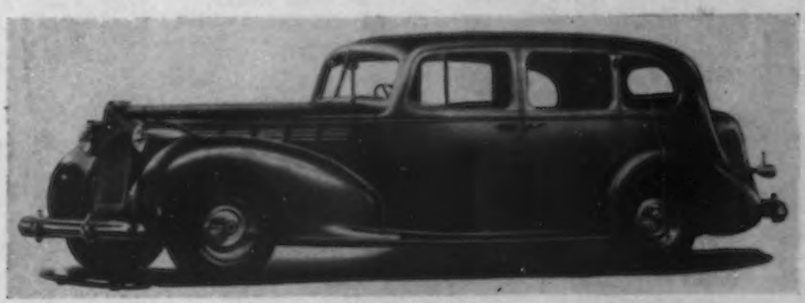
An unwarranted exaggeration has grown up about the extent of industrial diseases, according to Dr. Carey P. McCord, who directs the Bureau of Industrial Hygiene of the Detroit Department of Health. Referring to misconceptions and exaggerations as to such diseases — "their frequency, difficulty of diagnosis, futility of treatment and the havoc imposed upon workmen in general"—Dr. McCord said that with present means of prevention it is not likely that there will be more than 2000 cases in any year in Michigan. He said that he would put the estimate as low as 1200 normally, of which about 700 would be skin diseases.

He denied statements which he said were made some months ago when he was credited with having under his care over a short period of time 13,000 cases of lead poisoning, of which 1000 were alleged to have caused death. "The fact is," said Dr. McCord, "that for the period referred to by the story, I had not one case of lead poisoning under my care. One year ago a story was published saying that at one time in one industry in the state there were 10,000 active cases of lead poisoning and 50,000 border line cases, but the fact was that there were at that time just two active cases in that industry."

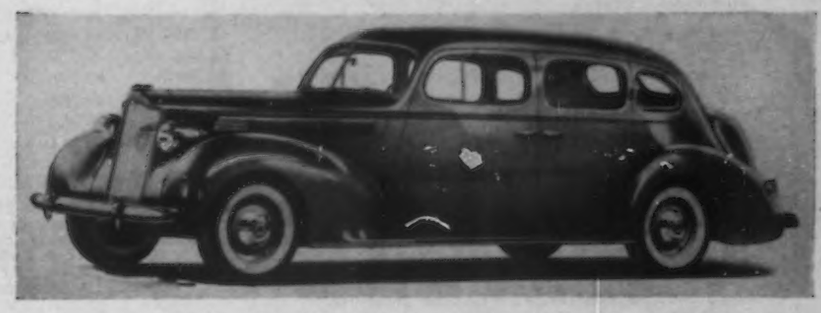
He attacked the standards of qualifications now set for expert medical witness in court cases. Training in occupational disease work, he added, long has been neglected in most medical schools. "We may hear a physician testifying fallaciously about silicosis from iron dust, coal dust or from titanium," he declared. "Patients with ordinary gastric ulcers, chronic appendicitis or colitis are medically paraded before a court as suffering from lead poisoning, occasionally in the entire absence

(CONTINUED ON PAGE 86)

NEW equipment at the De Soto press plant will add 50 per cent to the daily volume of sheet metal handled by the plant and will double the variety of sheet metal work handled in the plant. Five giant presses comprise De Soto's new fender line. This largest unit, a double-crank toggle type Toledo press, measures 132 in. between uprights and is 90 in. deep across the working section. It makes both left and right front fenders. The new fender stamping line heads the list of improvements in the De Soto plant for 1938 models.



The new Packard super Eight four-door touring sedan.



The 1938 Packard Six four-door touring sedan.

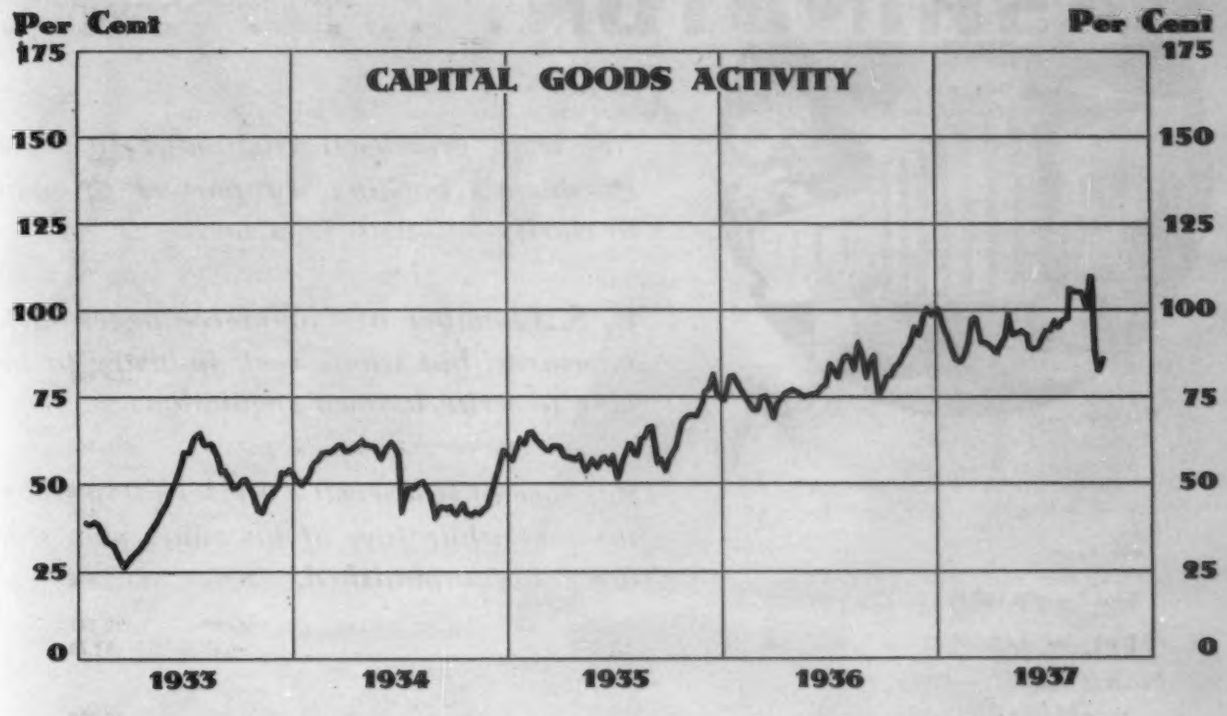
# Current Metal Working Activity Statistically Shown

**These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week**

| | August 1937 | July 1937 | August 1936 | Eight Months 1936 | Eight Months 1937 |
|---|---|---|---|---|---|
| **Raw Materials:** | | | | | |
| Lake ore consumption (gross tons)[a] | 5,373,264 | 5,236,487 | 3,968,845 | 27,407,391 | 39,983,710 |
| Coke production (net tons)[b] | 4,829,862 | 4,707,106 | 3,993,602 | 29,104,700 | 37,056,796 |
| **Pig Iron:** | | | | | |
| Pig iron output—monthly (gross tons)[c] | 2,711,721 | 3,498,858 | 2,711,721 | 18,834,215 | 26,811,269 |
| Pig iron output—daily (gross tons)[c] | 87,475 | 112,866 | 87,475 | 77,189 | 109,882 |
| **Castings:** | | | | | |
| Malleable castings—production (net tons)[d] | 49,022 | 45,479 | 42,253 | 360,758 | 446,356 |
| Malleable castings—orders (net tons)[d] | 49,376 | 41,353 | 45,179 | 351,265 | 425,587 |
| Steel castings—production (net tons)[d] | 92,089 | 86,978 | 81,574 | 501,810 | 775,628 |
| Steel castings—orders (net tons)[d] | 54,753 | 57,799 | 59,393 | 559,948 | 721,460 |
| **Steel Ingots:** | | | | | |
| Steel ingot production—monthly (gross tons)[e] | 4,861,789 | 4,556,596 | 4,184,287 | 29,374,754 | 38,183,018 |
| Steel ingot production—weekly average (gross tons)[e] | 1,097,469 | 1,030,904 | 944,534 | 842,649 | 1,099,741 |
| Steel ingot production—per cent of capacity[e] | 83.55 | 78.49 | 72.11 | 64.33 | 83.73 |
| **Finished Steel:** | | | | | |
| Trackwork shipments (net tons)[e] | 7,530 | 8,252 | 6,401 | 47,209 | 69,790 |
| Fabricated shape orders (net tons)[g] | 117,612 | 160,970 | 110,687 | 1,071,720 | 1,197,381 |
| Fabricated shape shipments (net tons)[g] | 158,228 | 144,560 | 142,709 | 990,077 | 1,082,844 |
| Fabricated plate orders (net tons)[d] | 30,212 | *27,480 | 31,999 | 323,730 | 308,937 |
| U. S. Steel Corp. shipments (tons)[h] | 1,107,858 | 1,186,752 | 923,703 | 6,905,904 | 9,908,884 |
| Ohio River steel shipments (net tons)[i] | 133,650 | 163,705 | 113,560 | 689,676 | 955,045 |
| **Fabricated Products:** | | | | | |
| Automobile production, U. S. and Canada[k] | 405,064 | *456,909 | 275,934 | 3,321,648 | *3,779,393 |
| Construction contracts, 37 Eastern States[l] | $285,104,100 | $321,602,700 | $275,281,400 | $1,807,356,700 | $2,100,358,000 |
| Steel barrel shipments (number)[e] | 771,427 | 715,014 | 599,125 | 5,251,254 | 6,812,768 |
| Steel furniture shipments (dollars)[d] | $2,022,913 | $2,071,417 | $1,438,611 | $12,160,745 | $17,804,516 |
| Steel boiler orders (sq. ft.)[d] | 917,927 | 979,316 | 1,080,552 | 6,841,109 | 7,350,552 |
| Locomotive orders (number)[m] | ..... | 3 | 3 | 134 | ..... |
| Freight car orders (number)[m] | ..... | 1,030 | 3,225 | 34,248 | ..... |
| Machine tool index[n] | 179.8 | 171.1 | 127.5 | †135.5 | †180.9 |
| Foundry equipment index[o] | 257.5 | 204.0 | 145.4 | †148.8 | †229.9 |
| **Foreign Trade:** | | | | | |
| Total iron and steel imports (gross tons)[p] | ..... | 47,012 | 60,697 | 427,782 | ..... |
| Imports of pig iron (gross tons)[p] | ..... | 8,310 | 12,524 | 122,527 | ..... |
| Imports of all rolled steel (gross tons)[p] | ..... | 26,116 | 28,216 | 171,622 | ..... |
| Total iron and steel exports (gross tons)[p] | ..... | 889,438 | 295,341 | 2,223,670 | ..... |
| Exports of all rolled steel (gross tons)[p] | ..... | 285,782 | 89,128 | 715,983 | ..... |
| Exports of finished steel (gross tons)[p] | ..... | 224,121 | 79,617 | 650,530 | ..... |
| Exports of scrap (gross tons)[p] | ..... | 420,097 | 194,600 | 1,437,690 | ..... |
| **British Production:** | | | | | |
| British pig iron production (gross tons)[r] | 712,600 | 729,300 | 635,800 | 5,046,000 | 5,432,900 |
| British steel ingot production (gross tons)[r] | 987,700 | 1,059,200 | 872,700 | 7,591,000 | 8,385,300 |
| **Non-Ferrous Metals:** | | | | | |
| Lead production (net tons)[s] | 46,965 | 45,496 | 33,542 | 297,133 | 346,595 |
| Lead shipments (net tons)[s] | 54,551 | 47,727 | 46,388 | 301,121 | 414,918 |
| Zinc production (net tons)[t] | 48,309 | 49,181 | 43,614 | 352,899 | 378,080 |
| Zinc shipments (net tons)[t] | 50,643 | 49,701 | 46,085 | 340,463 | 419,808 |
| Deliveries of tin (gross tons)[v] | 7,580 | 4,980 | 5,385 | 49,525 | 56,995 |
| Copper production, refined (net tons)[w] | 80,135 | 79,611 | 55,410 | 465,575 | 647,211 |

† Three months' average. * Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census. [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange; [w] Copper Institute.




### The Iron Age Weekly Index of Capital Goods Activity

(1925-27 = 100)

| | | | |
|---|---|---|---|
| Last week | 85.5 | Same week 1933 | 50.7 |
| Preceding week | 82.9* | Same week 1932 | 32.6 |
| Same week last month | 100.0 | Same week 1931 | 52.5 |
| Same week 1936 | 77.6 | Same week 1930 | 77.0 |
| Same week 1935 | 57.4 | Same week 1929 | 113.1 |
| Same week 1934 | 40.6 | * Revised | |

AFTER a steady decline from the peak established during the week of Aug. 14, activity in the production and distribution of durable goods reversed its trend and advanced 2.6 points to 85.5 for the week ended Oct. 2, according to THE IRON AGE seasonally adjusted index. Increasing automobile assemblies as the new models go into production was the basis of the advance. A marked decline of 5.8 points in activity in the Pittsburgh area brought that factor to the year's low point of 98.4. This recession was caused primarily by the counterseasonal reduction in the operating rate of the iron and steel industry in that section.

| | Latest Week | Change from Preceding Week |
|---|---|---|
| Steel production (per cent of capacity) | 74.0 | —2.0 |
| Automobile production (number of cars and trucks) | 45,830 | +17,800 |
| Railroad loadings of forest products (number of cars) | 39,284 | —352 |
| Pittsburgh industrial production and shipments (index number) | 98.4 | —5.8 |
| Construction contracts awarded (total value) | $42,494,000 | —$1,183,000 |

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

# WASHINGTON. . . . . .

*. . . New trade practice legislation likely to get President's backing, supporters of plan to clarify anti-trust laws say.*

o o o

*. . . U. S. Chamber of Commerce urges such measures, but wants each industry to be able to write its own regulations.*

o o o

*. . . Purpose of Roosevelt's Western trip still a mystery while foes of his court plan still are going unpunished.*

o o o

By L. W. MOFFETT
*Resident Washington Editor*
*The Iron Age*

o o o

WASHINGTON, Oct. 5.—Reports that the Administration is planning to push for enactment of trade practice legislation to supplement a minimum wage and maximum hour law, recurrent ever since the NRA collapsed at the hands of the Supreme Court, lack White House confirmation, but some Administration adherents of the plan see in the President's Constitution Day speech, in which he referred to the necessity of curbing disruptive trade practices, the possibility that Mr. Roosevelt is ready to back such legislation.

Ernest Draper, Assistant Secretary of Commerce, who has conferred frequently with Donald Richberg, former NRA administrator, on a possible trade practice law, insists that any proposed legislation, while still definitely under consideration, is lying dormant for the time being.

Mr. Draper told THE IRON AGE that one of the most baffling problems faced by the Administration before it is committed to sponsoring a new trade practice law is clarification and revision of the anti-trust laws.

Of course, minor revision could be written into a trade practice law, as it is in one bill pending in Congress at the present time, but key Administration advisers have been represented as favoring a general overhauling as against doing the job "piecemeal."

Draper's view is that business is entitled to have its rules of conduct defined in a "clear and understandable manner," and that under present conditions members of industry are "hopelessly at sea over what they are and are not permitted to do."

"Court decisions are usually depended upon to clarify controversial points," Draper says. "But our anti-trust laws in particular have become more and more muddled as a result of judicial interpretation so that now you can quote a judicial decision for almost any act of business conduct in the anti-trust field.

### Should Revise Laws

"As a part of its service to industry, government should redraft these laws so that they will be both intelligible and fair to the average business concern."

Pointing out that there is considerable sentiment among some business groups for trade practice legislation, Draper, who was recruited from business ranks when the new Deal first came into power, insists that such a law cannot be avoided if "small business units are to be given protection."

The U. S. Chamber of Commerce substantiates his claim that there exists business sentiment favoring trade practice legislation, but takes the position that each industry should be permitted to formulate its own rules of fair competition which would become effective after receiving Governmental approval.

### Urge Limited Power

"A governmental agency, named by the President," the Chamber reports, "should have only the power of approval or veto of such rules, without power of modification or imposition but with power to indicate conditions of approval."

Such rules of fair competition should contain provisions for minimum wages, for maximum hours of work and against child labor, according to this business group. Also, it favors a mutual right on the part of both the Government and a particular industry to terminate agreements just as a group enjoyed the right of initiating the agreement. It holds, however, that there should also be opportunity for members of an industry to enter into agreements other than rules which, when approved by the Governmental agency, will be enforceable against parties to the agreement.

"Rules of fair competition for-

The Beauty Never Fades
$AVE
with
$UPERIOR $TAINLESS
$TEELS
SUPERIOR STEEL CORP.
SUPERIOR STAINLESS STEEL

mulated by a clearly preponderant part of an industry as suitable for the whole industry with due consideration for small units and approved by the Governmental agency should be enforceable against all concerns in the industry," according to the U. S. Chamber.

### New NRA Unlikely

There is little indication, however, that the President will ever again sanction any plan permitting industry to write its own ticket as it did under the NRA. Instead, some reports have it that the plan may call for "voluntary agreements" which after acceptance would carry certain advantages. Enforcement would be in the hands of the Federal Trade Commission while the Department of Commerce presumably would negotiate with industries up to the point where agreements were consummated, an arrangement which observers point out would hardly be conducive to any degree of congruity.

In its reported plan, the Administration not only faces the anti-trust bug-a-boo, but also the difficulty of drawing up a specific bill. It is reported that there are several plans under consideration by various New Deal lieutenants, and the Administration is at loggerheads as to which one should receive its support.

As one Administration intimate expressed it, "everyone agrees that something should be done, but no one knows just what plan should be followed."

### Broad Standards Needed

There is the task of arriving at standards of competition which would be broad enough to satisfy the needs of all industries and at the same time prove effective.

A few rules could be written in the statute, it is pointed out, such as, for example, the wage and hours standards incorporated in the pending Black-Connery bill, but the task of proposing other competitive standards for all industrial groups is difficult.

Just how the Administration could avoid the NRA stigma of unconstitutional delegation of legislative authority under any plan other than by designating definite competitive standards in the law itself is a subject for speculation.

The trade practice conference procedure of the Federal Trade Commission, a practice generally indorsed by business interests as a useful and proper means of promoting better standards and the elimination of unfair competitive practices, could be enlarged upon by the Administration, but it is believed in some quarters that a more drastic plan is being hatched in the New Deal brooder.

### The Lamneck Bill

Approaching the NRA law in a good many features, the Lamneck bill, still pending in the House Judiciary Committee, was relegated to the background at the last session when the Black-Connery wage-hour bill was pushed by the Roosevelt Administration.

The measure, which would revise the Clayton Act and legalize voluntary codes to ban unfair trade practices, child labor, and excessively low wages and long hours, would be administered by the FTC.

The procedure outlined in the bill would permit 40 per cent of the volume of production of an industry to draw up a proposed code, which if approved by 60 per cent of the industry and by the FTC, would become binding upon the entire industry. Though introduced by a Democrat, Arthur Lamneck, of Michigan, there is no indication that the Administration intends to throw its strength behind this particular bill.

---

# President, Like Santa Claus, Gets Warm Welcome In Western States

WASHINGTON, Oct. 5.—Mystery shrouds the purpose of President Roosevelt's swing through the West and Northwest. Even the large corps of newspaper correspondents who are accompanying him on his deluxe special train are confounded.

The nature of the President's speeches has caused a change from their original views as to his mission. Before the junket was begun it was the common belief that the President, angered at the defeat of his Court packing plan, was going to set a political fire of destruction under Senators in his own party who put a crimp in his Court "reform" bill. But the President has not even mentioned this. Instead of castigating New Deal Senators who were most instrumental in defeating the Court packing bill, the President even received on his train the Senator who is said to have been the chief author of the report on the bill, with its sharp arraignment of the plan—O'Mahoney of Wyoming.

### Borah Heartily Welcomed

It is true that the Senator appears to have forced his presence on the President but the fact remains he was accorded Presidential recognition, rather frigid though it was. As for another bitter opponent of the bill, Senator Borah of Idaho, who rates himself as a Republican, but has a strain of New Dealism in him, the President almost bubbled over him.

Perhaps, as many think, it was the purpose of the President at the outset of his trip to strike out against opponents of the Court bill but that he changed his mind when he discovered that the opposing Senators were popular among their constituents and also that the West and Northwest are indifferent to the Court issue.

### Audiences Say "Gimme"

But whatever the President's purpose he again saw that Santa Claus is always popular. He is the supreme vote-getter. For the outstanding impression the country is given of his trip is the eager, "gimme" attitude of his audiences. They seemed to be made up of Oliver Twists, always wanting more—but with less reason than the unfortunate Oliver himself had.

The slightest mention of pouring more money into a project, the Bonneville Dam, the Fort Peck Dam in Montana, or any other undertaking, evoked loud applause among his hearers and made politicians smack their lips in agreeable anticipation of pap and patronage that they envisioned.

The unabated Presidential proposal to proceed further with the distribution - of - wealth program, while sourly received by capital, was given a warm hand by his hearers in the western country as it is in other sections, especially since coupled with the announcement was an easy assurance that there is no need to worry about the Government debt—hoisted to the incomprehensible altitude of $37,000,000,000, which has to be paid by the taxpayers, who include all the people.

### Becoming Tax Conscious

It may be added that more and more of those who do not pay direct taxes to the Government are becoming acutely conscious of the hidden taxes they are paying be-

cause of their growing multiplicity and amounts. Fastened on every ton of finished steel, whether to build a cooking range for the housewife or a girder for a railroad bridge, is about $4 in taxes.

The promise to balance the budget was again made by the President, who said this time he hopes to accomplish the feat next year. This pledge was greeted with restrained applause as though it was an often-told tale which will carry conviction if and when the pledge really becomes an accomplished fact. In Washington at the same time, as if by pre-arrangement, Secretary of the Treasury Morgenthau echoed the "hope" but no definite promise that the budget will be balanced next year.

The President's guarded hints of cutting off on the spending spree, in striking contrast to assurances of engaging further on projects, electrification of power dams, reclamation, etc., received no applause. Suggestions that Santa might let down on his visits did not go over well.

### Tax Statement Chilling

And the statement of Morgenthau that it may be necessary to increase taxes if this year's fiscal picture shows that a balanced budget cannot be obtained in any other way lent stimulus to the jittery performance of the stock market and gave a chill to business enterprise.

Some industrialists, however, say the feeling of business uneasiness over the Government fiscal policy is not justified. Representative Emanuel Celler, Democrat of New York, challenged Morgenthau's statement as to the necessity of further increasing taxes. He said that the country has reached "a saturation point in taxation." He gave it as his opinion that there is no necessity for increasing taxes. Rather, he said, a "proper revision" of the present tax structure is imperative and would yield more than sufficient funds to balance the budget.

Speaking for two bills he has introduced, and whose passage he urged, Rep. Celler said they would provide a "proper revision" of the tax structure. One would amend the capital gains and losses taxes. The other is a proposed modification of the undistributed profits tax.

### Near Saturation Point

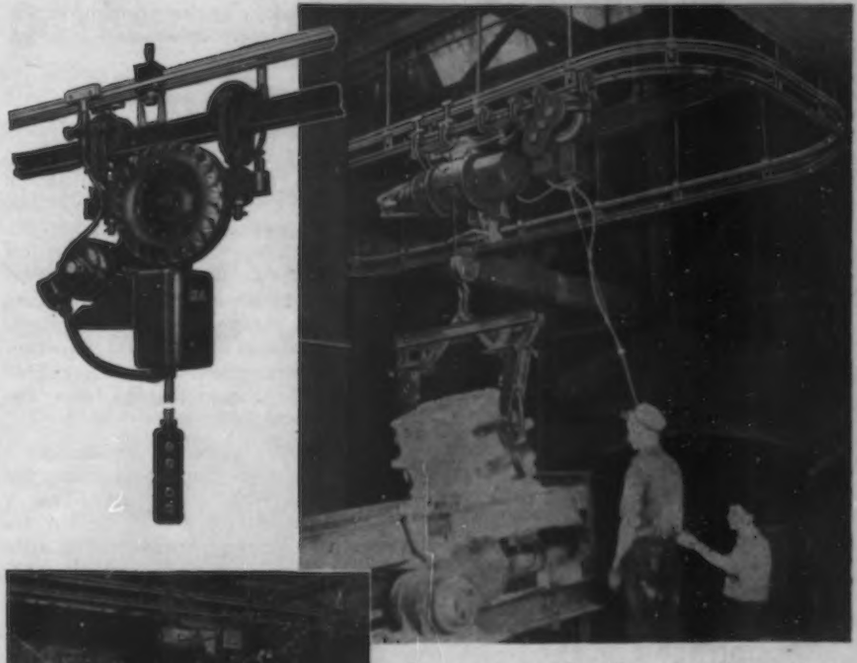
He promised that the two measures would prevent present taxes from (1) going beyond the point of diminishing returns; (2) being punitive or revengeful, and thereby thaw out the chocked-up and frozen avenues of distribution in business; and (3) prevent tax avoidance and evasion by removing the incentive to invest in tax-exempt securities.

Pointing out that rates in many present levies have not only reached the saturation point but have actually gone beyond the point of diminishing returns, Celler recommended that Morgenthau study the record of three of his predecessors: namely, Carter Glass, David Houston, and Andrew W. Mellon who, he said, were governed by the principle that you must never increase taxes beyond the point of diminishing returns.

### Must Reduce Rates

"We must now reduce our rates and thereby produce more revenue," Celler said. In substantiation, he said that a 25 per cent maximum income tax rate in 1927 brought more revenue than was obtained from a maximum rate of 46 per cent in 1924; also, that a 12½ per cent flat rate on capital gains, provided in the Revenue Act of 1921, yielded more than $240,000,000 in


American MonoTractors accelerate foundry handling



By eliminating the "heave" and "tug" labor of handling loaded annealing pots through shakeout process, a modern foundry cut 64% from the cost of unloading its furnaces.

This remarkable saving lead to the installation of similar systems in the cleaning department. Small castings now are tumblasted, sorted and weighed with but one rehandling from original tote boxes.

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a single year, whereas the present rates, which are "much higher," yield only one-tenth as much, or $25,000,000 annually.

Meanwhile a special House committee is making a so-called study of taxation to devise means for raising more revenue both by revision of the tax administrative laws and by new assessments. One reported suggestion that has proved rather startling is to enact a law which would make employers act as check-offs for the Treasury Department by withholding taxes from payrolls of employees. It is even said the plan, to work like the Social Security Act, looks to a heavy reduction in the present exemption so that taxes would be assessed to workers of very small income.

**Another Hidden Tax**

Supposedly, the theory is that they would not be so conscious of the tax if they were not required to make direct reports to the Internal Revenue. It would be, theoretically at least, another form of the hidden tax, thereby lessening danger of unfavorable political reaction than is inherent in direct contribution to Uncle Sam's kitty, so sadly in need of replenishment.

But it may well be doubted that the "little fellow" will be confronted with this prospect at an early date. However, whether aware of it or not, he is contributing hidden taxes whenever he purchases anything, from a loaf of bread to a suit of clothes.

And it is inevitable that he will pay even more and his great grandchildren will be paying before the enormous bill of Santa Claus is liquidated.

## Contract For Big Liner Is Awarded

WASHINGTON, Oct. 5.—The United States Maritime Commission last Thursday announced award of contract for a ship to replace the Leviathan to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., at $15,750,000 on an adjusted price basis. The vessel, described as "the finest and safest liner on the seas," will be a 34,000-ton ship requiring about 12,000 tons of steel. It is to be operated by the United States Lines Co.

**McCabe Machinery Co.**, New York, has moved into new offices at 205 East 42nd Street, New York.

## Republic To Drop Bid For Coal Code Exemption, May File Again

WASHINGTON, Oct. 5.—Republic Steel Corp., through its counsel A. J. Gentholts, of Cleveland, last week asked the National Bituminous Coal Commission for permission to withdraw its pending application which sought exemption from the coal code on the ground that the corporation's captive production is purely intrastate coal.

At the same time, Mr. Gentholts told a commission examiner that his company plans to dissolve the Trumbull Cliffs Furnace Co., of Warren, a subsidiary which has always used coal from Republic mines and, also, had cancelled all sales contracts of the company's Sayerton mines in Alabama so that hereafter the entire production will be exclusively consumed by Republic plants.

**See New Application**

In view of this action, it is expected that Republic may subsequently file another application seeking exemption from the code for its captive mines under the captive clause. By shutting off shipments to the commercial market and by absorbing the subsidiary furnace company the corporation, it is pointed out, would substantially strengthen its chances for favorable consideration from the coal board.

The patronage-torn commission has indicated that on coal shipped from a mine, maintained as a separate corporate entity, to its parent company, a transfer of title exists and that therefore the coal cannot be exempted under the captive mine clause. On that basis it has scrutinized the corporate setup of all applicants appearing before it and in general those who have sought exemption have presented their cases accordingly.

**Others Have Withdrawn**

The United States Steel subsidiaries, the Columbia Steel Co., San Francisco, and the Tennessee Coal, Iron & Railroad Co., Birmingham, also have withdrawn pending applications although no information has been forthcoming from the commission as to why such action was taken.

Coupled to the reports that the two companies desire to wait the outcome of other pending cases was the view that action similar to that taken by Republic may be contemplated.

Just when the commission will take action on the pending applications is not known. Pending final disposition, applicants will be required to adhere to the code, according to commission officials.

The coal board forecasts that prices would be put into effect early in October, but those who have attended the current sessions covering coal classifications into price groupings, a preliminary step before prices are made effective, say the governmental stabilizing body is getting nowhere.

In an atmosphere of endless bickering, commission members are cracking down on coal operators in an apparent effort to speed up the price-fixing machinery, charging members with failing to comply with its orders, and in general attempting to impress the industry that it means business.

Reports about harmonious relations between commission members and with their dealings with the coal industry, which find birth within the coal board, are invariably shattered during public hearings. A spokesman for the Carter Coal Co., of West Virginia, which successfully challenged the constitutionality of the original Guffey act, last week threatened to take legal action against the commission under the new law.

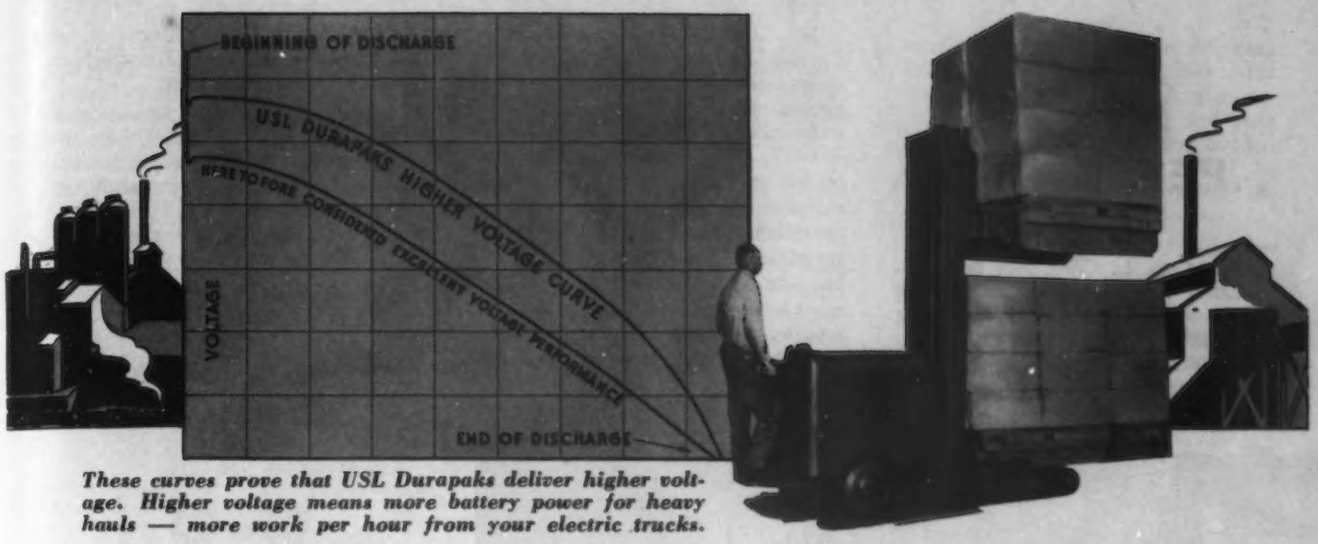
**Threatens Legal Action**

"I very strenuously object to the statement you have just made," said Commission Chairman Charles F. Hosford to H. J. Jacobi, vice-president of the Carter firm.

Jacobi apologized but indicated "we'll go to the Circuit Court of Appeals on that question," referring to alleged competitive advantages given some companies under the NRA coal code. He expressed fear that the same thing would occur under the Guffey law.

The Commission's reluctance to listen to any court litigation threat is understandable in view of its experience under the old coal law when its hands were hopelessly tied after the Carter concern had started legal proceedings almost before the ink had dried on the President's signature.

But thus far the new law has been uncannily free from any unconstitutional taint but commission members have had their fingers crossed. That it was only a question of time before legal proceedings were begun against the commission, as related on page 71 of the Sept. 16 issue of THE IRON AGE, is substantiated by the Carter Coal Co. statement.

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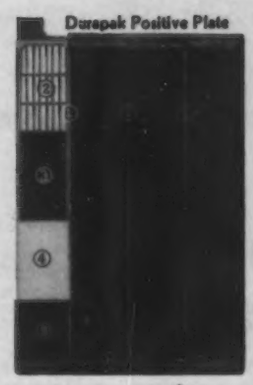
**(1)** ***Patented "Sectional" Plate Construction*** **eliminates plate failures due to expansion and contraction stresses.**

**(2)** ***Extra Heavy One-Piece Plate Grid*** **provides greater mechanical strength and longer plate life. Extra heavy grid bars provide quicker flow of current from plate and greater electrical contact between plate frame and active material. Result—greater power output under heavy loads and longer plate life.**




**(3)** ***Activite, the Special USL Plate Material*** **is more active chemically and gives USL Durapaks greater electrical output.**

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- ☐ Marine

NAME OF COMPANY ADDRESS

ATTENTION OF POSITION

## . . PERSONALS . .

WALLACE L. COOK has been appointed director of personnel and Lawrence G. Andrews assistant director of personnel for the Chicago district of Carnegie-Illinois Steel Corp.

Mr. Cook is a graduate of Cornell and received his master's degree at Yale. He has been connected with the Carnegie-Illinois industrial relations division since June 1, 1936. Previously he had served on the board of several educational institutions and had been prominent in industrial relations activities of trade associations. He has taught college courses in mechanics, maintenance, philosophy, government and public speaking. Since going to Carnegie-Illinois, Mr. Cook has concentrated on coordinating the functions of selection and training of employees for the Chicago district.

Upon graduating from Ohio State University, Mr. Andrews received a scholarship from the bureau of personnel research at Carnegie Institute of Technology. From 1921 to 1926 he served as an assistant employment manager for the Jones & Laughlin Steel Corp., Aliquippa, and in 1926 entered the personnel department of Armour & Co. He has been assistant superintendent of industrial relations at South works of Carnegie-Illinois since January, 1936.

W. L. COOK

L. G. ANDREWS

❖ ❖ ❖

WILLIAM C. CARTER and Edward J. Burnell have been elected vice-presidents of the Link-Belt Co., Chicago.

Mr. Carter, a mechanical engineering graduate of the University of Illinois, joined the Link-Belt organization in 1902 as a draftsman. He has consecutively held the positions of engineering department

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• Fifteen months ago the Intertype Corporation modernized drilling, reaming and tapping operations on cast iron face plates for typesetting machines by installing five Super-Service Radials.

Production time per piece has been reduced from 47.7 minutes to 41.7 minutes. Where three handlings were formerly required, all operations are now performed in one handling.

Quoting Mr. C. E. Bittner, Works Manager, "The high spindle speeds permit us to drill small holes faster and straighter. We have been able to discard a single purpose drill press."

If more and better work at lower cost per piece interests you, modernize drilling, tapping and reaming with Super-Service Radials. Write for detailed information.

THE CINCINNATI BICKFORD TOOL CO., OAKLEY, CINCINNATI, OHIO

CINCINNATI BICKFORD

supervisor, construction superintendent, plant superintendent, plant general manager, and in recent years has been in charge of company production, with headquarters in Chicago.

Mr. Burnell, a mechanical engineer, from Lehigh University, joined the Link-Belt organization in 1913 also as a draftsman. He has consecutively held the positions of salesman at the company's Pittsburgh office, district sales manager at Boston, district sales manager at Pittsburgh, general sales manager of Western division territory with headquarters at the Pershing Road, Chicago, plant, and more recently has been general manager of that plant.

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J. H. ROBINSON has been selected vice-president in charge of sales of the Wheeling Corrugating Co.

J. H. ROBINSON

A. R. JOHNSON

He has been associated with this company since January, 1899. In 1906 he went to Detroit as a salesman, and in 1907 opened the Detroit sales office. In 1911 he was transferred to the St. Louis territory as assistant manager and became manager of that office in 1923. He returned to Wheeling in 1931 as secretary and has held that position until the present promotion.

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A. R. JOHNSON, formerly manager of the Detroit office of Cutler-Hammer, Inc., Milwaukee, has been appointed manager of the merchandising sales division of the company, in charge of distributor sales. He became identified with the company in 1917 as a member of the sales department and was transferred to the company's Chicago office seven years later. In 1928 he was moved to Detroit as manager of that sales office.

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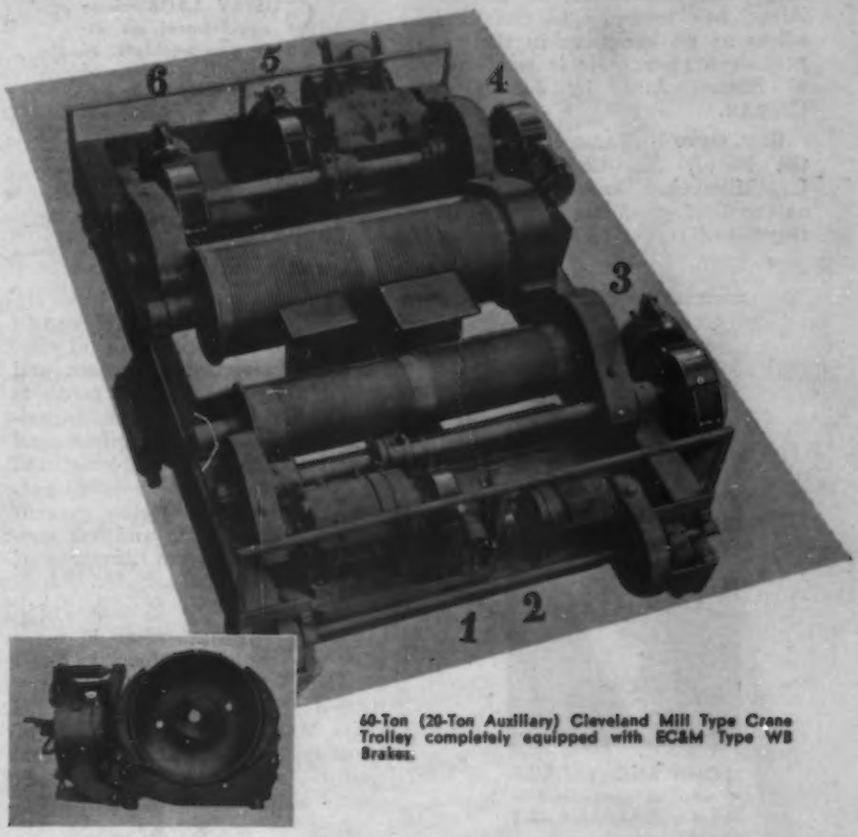
C. CLARK WALES, who recently resigned as chief engineer of the Otis Steel Co., Cleveland, has been appointed assistant general man-


# BRAKES BY EC&M




60-Ton (20-Ton Auxiliary) Cleveland Mill Type Crane Trolley completely equipped with EC&M Type WB Brakes.

BRAKES by EC&M—the above illustration is one indication of the swing toward EC&M Type WB Brakes for cranes and mill applications.

To-day, more and more specifications call for this brake having thicker-than-average brake blocks which are made of an extremely tough material and which have a constant coefficient of friction throughout their entire life. This means uniform braking action—long life—and infrequent adjustment because the wear is uniform and slow.

Another factor contributing to the popularity of these highly efficient brakes is the simplicity of design which permits, when necessary, quick brake-shoe-block replacement or installation of a new armature without disturbing the original adjustments.

When buying cranes, mill machinery or similar equipment requiring a direct current or mechanically-operated brakes, specify EC&M Bulletin 1004-B Type WB Brakes.

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ager of the Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont.

❖ ❖ ❖

H. R. GRAVENSTRETER has been appointed assistant to the general superintendent of the Shenango works, New Castle, Pa., of Carnegie-Illinois Steel Corp. He had been master mechanic of the plant. He is a graduate of the Case School of Applied Science and has been associated with subsidiary companies of the United States Steel Corp. since 1917.

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ROBERT SINCLAIR, for the past three years manager of the Argentine office of the Allis-Chalmers Mfg. Co., Milwaukee, at Buenos Aires, has returned to the head offices as an executive in the export department. He is succeeded at Buenos Aires by JAMES A. CONLAN.

GEN. OTTO H. FALK, chairman of the board, Allis-Chalmers Mfg. Co., Milwaukee, has been selected as the 1937 candidate for the distinguished service medal awarded annually by the Cosmopolitan Club of Milwaukee for meritorious services to the community and general philanthropic enterprises. The presentation will be made on Oct. 27 at a dinner given by the organization with members of other Milwaukee service clubs as guests.

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DR. ARTHUR SIMON, since 1903 associated with Cutler-Hammer, Inc., Milwaukee, in executive engineering capacities, has established an office at 828 First Wisconsin National Bank Building, that city, as an engineering consultant and patent attorney. He will continue with the Cutler-Hammer organization as consulting engineer and expert on patent problems and litigation. He holds about 40 patents on control of electric current and related subjects and has contributed much to the literature of the science.

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FRANK T. PULSE, after 40 years of service with the American Steel & Wire Co. and its predecessors, retired Oct. 1. For the last 28 years Mr. Pulse was in charge of casualty, safety, sanitation and welfare of the Chicago district plants of the company.

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H. MCE. PATTON has joined the staff of the research and development division of the Jones & Laughlin Steel Corp., Pittsburgh. He was formerly with the Pittsburgh Steel Co.

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LEONARD T. BEECHER, secretary and treasurer of the Tennessee Coal, Iron & Railroad Co. since 1901, has retired under the retirement plan of the United States Steel Corp., with which he has been continuously affiliated for more than 45 years. He will be succeeded by C. R. SEXTON, who has served as assistant secretary and assistant treasurer since 1923. THOMAS CHALMERS, vice-president in charge of operations, succeeds Mr. Beecher as a director of the company.

Mr. Beecher started his career as a bookkeeper in the general offices of the Illinois Steel Co. He worked successively in a clerical capacity in the operating department, accounting department and in other lines with the Illinois Steel Co., the Minnesota Iron Co., and the Duluth & Iron Range Railroad.

Mr. Sexton was graduated in 1911 from the University of Wisconsin and spent some three years in the statistical department of the Wisconsin State Railroad Commission. In 1913 he became identified with the Tennessee Coal, Iron & Railroad Co. as chief clerk in the treasury department, and was made assistant secretary in May, 1918.

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GEORGE H. CORLISS, for the past four years advertising and sales promotion manager for the Lewis-Shepard Co., Boston, has been appointed regional manager for the company, with headquarters in Los Angeles.

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JAMES A. SLATER, vice-president in charge of railway sales of the National Malleable & Steel Castings Co., Cleveland, has been elected a director, to fill the vacancy caused by the death of Oliver W. Loomis.

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DR. JOHN CHIPMAN, since 1934 associate director of research for the American Rolling Mill Co., Middletown, Ohio, has been appointed professor of metallurgy at

GUSTAV LAUB whose appointment as assistant vice-president of the Vanadium Corp. of America, New York, was announced in these columns last week, is a graduate of the University of Pittsburgh, and has been identified with the company since 1916.

JOHN McC. LATIMER, who, as announced in these columns last week, has been made exclusive representative in the western Pennsylvania territory by Lukenweld, Inc., Coatesville, Pa.

GEORGE H. BENDELL, new superintendent of the Waukegan plant of the American Steel & Wire Co. Details of his career appeared on page 100 of The Iron Age of Sept. 16.

# Use Dodge Steel Castings for Safety and Dependability

AFTER ten years of study, The American Standards Association has just completed a proposed Code for Recording Accident Causes. A remarkably fine piece of work, American Industry now for the first time is provided with a basis on which to collect data which will be helpful in determining the causes of industrial accidents.

Was it a gear that let go which should have been a steel casting but wasn't? Was a broken pinion at fault which, had it been made of the strongest and toughest of all cast materials (cast steel), would have stood up? The new Code may furnish the answers to such questions.

We know that weaker materials used in mechanical structures of all kinds have cost industry millions of dollars in lost-time accidents and disrupted production schedules. What we do not know is what the percentage of such accidents is with respect to the total, and the exact causes in detail.

The new Accident Cause Recording Code, if widely adopted, as it well deserves to be, may clearly reveal the economy of buying only the highest grade machinery and equipment built of the strongest and safest materials.

Ranking well up toward the top of the list is cast steel — universally used where absolute safety and dependability are vital considerations. Let Dodge Steel Castings help you prevent accidents and breakdowns. Dodge Castings are an insurance against costly failures. You can place complete confidence in steel castings bearing our trade mark.

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An unending variety of things stamped and formed out of ferrous and non-ferrous metals.

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Products formed of flat, round or half round wire.

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Electro-plating, chemical coloring, japanning, spray lacquering, enameling.

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Building of machinery for cigar box, brush, wood product and other manufacturers.

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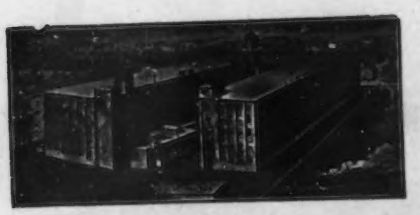

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Massachusetts Institute of Technology. Dr. Chipman received his bachelor of science degree from the University of the South in 1920, after interrupting his course in 1918 to serve in the Army. He was awarded the master of science degree in 1922 from the State University of Iowa. For the following two years he was assistant professor of chemistry in Illinois Wesleyan University. After receiving his doctorate in 1926 from the University of California, he taught at the Georgia School of Technology and the University of Michigan. Dr. Chipman has been awarded the Howe medal by the American Society for Metals for a paper on "The Application of Thermodynamics to the Deoxidization of Liquid Steel."

CHARLES VELIE and RAYMOND HEATH have been added to the field staff of the Hancock valve division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. Mr. Velie will make his headquarters in Chicago and Mr. Heath in Dallas, Tex.

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VIRGIL W. MCDANIEL, who for the past two years has been connected with the parts division of the Chrysler Corp., Detroit, has been appointed general sales manager of the Eclipse Counterbore Co., Detroit, succeeding J. E. MACARTHUR, who has resigned. Mr. McDaniel is a graduate of Massachusetts Institute of Technology, and during the past several years has specialized in industrial sales management activities.

## ...OBITUARY...

ERNEST J. LEES, vice-president and chief engineer, National Tool Co., Cleveland, and prominently known in the machine tool industry through his development of gear cutting machinery, died suddenly Sept. 27. He was one of the founders of the Lees-Bradner Co., Cleveland, maker of gear cutting machinery, but five years ago disposed of his interest in that company and became affiliated with the National Tool Co., Cleveland, as chief engineer. When the company was reorganized recently he was made vice-president.

Mr. Lees is credited with designing helical and worm gear drives for heavy milling machines, designing and building the first spur and helical gear generating hobbing machine marketed in the United States, designing and making the first helical gears cut by the hobbing process and used as timing gears in this country, designing and manufacturing the first hobs made in the United States for generating sprocket gears for Morse chain as a drive for electric automobiles, designing and manufacturing the first ground generating hobs made in this country and known as hyperboloid hobs, developing and using the first formula for generating helical gears on a hobbing machine without using a differential, being instrumental in inventing and designing the first thread millers made in this country for fine thread milling, using a ring type or multiple type cutter, designing and building the first commercial gear generating grinders marketed in the United States, designing and building gear testing machines as companion machines for gear grinders, designing and building a six-spindle full automatic machine for making twist drills from the bar, designing and building a positive opening chuck, designing the original single lap hob later marketed as the convolution hob,

E. J. LEES

and with designing and building the original positive automatic micrometer stock for gear generating machines.

❖ ❖ ❖

CLARENCE R. FALK, secretary and treasurer of the Falk Corp., Milwaukee, and prominent civic leader and industrialist, died on Sept. 29, aged 67 years. He was born in Milwaukee on Nov. 27, 1869, and was graduated from Harvard University in 1893, then spending a year in law study there. In 1901 he became associated with the Falk Corp., working through all departments, and was made a vice-president and works manager in 1914. He served prominently in the World War, winning a captaincy in the Quartermaster's Re-

serve Corps by attending the officers' training camp at Plattsburg, N. Y., in 1916. He retired from the United States Army late in 1918 as a major, and in March, 1923, was commissioned a lieutenant-colonel in the Officers' Reserve Corps. He was a past-president of the National Metal Trades Association and remained a director until his death. For years Col. Falk served as a member of the industrial relations committee of the American Foundrymen's Association. He was a brother of Herman Falk, president of the Falk Corp., and of Gen. Otto H. Falk, chairman of the board of directors of the Allis-Chalmers Mfg. Co., and vice-president of the Falk company.

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JOHN E. GILSON, president of the J. E. Gilson Co., Port Washington, Wis., manufacturer of gray iron castings, died on Sept. 29, aged 59 years. He was born in Port Washington and in 1899 joined his father in the Gilson Mfg. Co., specializing in chair and furniture hardware casting, serving as vice-president until they sold their interests in 1914. Two years later Mr. Gilson founded the J. E. Gilson Co., and was its president until his death.

C. R. FALK

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FRANKLIN P. GURNEY, formerly a part owner of the Central Iron Foundry, East Boston, died at his home there on Sept. 28. He was born in Chelsea, Mass., in 1852, was apprenticed as a machinist, and subsequently became associated with his brother, Edwin D., in operating and owning the foundry, succeeding his father, who established the business in 1853. Mr. Gurney remained in business about 35 years and then the foundry was sold to the Gurney Heater Co., Toronto.


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# Use of Gas in Making Tool Steels Discussed at Association Meeting

DEVELOPMENTS in the use of gas and improvements in gas-fired heating furnaces for the manufacture of tool steels were discussed in a paper on advanced applications of gas to forging fine steels presented by Adam M. Steever, superintendent Columbia Tool Steel Co., Chicago Heights, Ill., at the nineteenth annual convention of the American Gas Association held at the Cleveland and Statler Hotels, Cleveland, Sept. 27 to Oct. 1. The results presented in the paper represented accomplishments with oxidizing atmosphere which the speaker pointed out is generally preferable to reducing atmospheres in direct-fired ferrous metal heating furnaces.

For the manufacture of fine steels for precision tools the speaker said that one of the most important problems, if not the most important, is the absolute control of the heating processes. After several years of laboratory research and shop experiment, a heating furnace was converted to a completely controlled gas fired unit. For many years furnaces of the type converted had been fired with coal in accordance with the general practice in the tool steel field. An entirely new approach to the problem of gas use was responsible for the success of this installation. This new approach involved the recognition that gas is a metallurgical chemical as well as a source of heat.

The conversion work involved redesigning the combustion end of the furnace and installation of multiple low-pressure burners. The combustion chamber was approximately 7 ft. wide, 6 ft. long and provided the necessary volume for combustion and complete equilibrium of the gases before passing over the product being heated. By using an air gas mixture to produce an oxidizing atmosphere, a fine scale was produced which was removed readily during the mechanical working of the product. While there is a slight surface decarburization, it was reduced 66 2/3 per cent and scaling 75 per cent compared with previous standard practice. With gas fuel the furnace operated under positive pressure, assuring complete atmosphere uniformity throughout the furnace.

### Additional Furnaces Installed

From the experience gained from the first unit, six additional furnaces were converted to gas and new furnaces have now been installed with additional improvements. These newly built furnaces which serve steam forging hammers, ranging in falling weight from 750 lb. to 8000 lb., the speaker said, have shown an additional improvement in performance, a further reduction in scale and in control of surface decarburization, resulting in a greater net return per pound of material processed.

The new furnaces embody improvements in combustion chamber design and in the application of burners and controls. Accuracy of combustion control, according to Mr. Steever, has been made possible by availability of natural gas of uniform heating value and the combustion of this gas at positive

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# *check*
## HOLE DIAMETER, TAPER AND ECCENTRICITY *in one operation*

Inspection of piston pin holes, connecting rod bearings, and other hole diameters up to 6 inches can be accomplished faster and more economically by the Sheffield Internalgage than by any other means.

Variations in diameter, taper and out-of-round can be read directly on the dial of the Visual Gage on which the Internalgage is mounted. Individual dial divisions register from one "tenth" to 10 millionths depending on the Visual Gage selected. The Internalgage is just as reliable, accurate and convenient as the Visual Gage with which it is used.

If you have a hole inspection job to do, ask Sheffield for suggestions.

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*Dayton, Ohio* **U. S. A.**

pressures with a uniform and predetermined air supply.

The new furnaces are of the box type and of the so-called portable design, the steel under frame resting on but not fixed to a heat resisting concrete slab. Having no stacks and being connected only to gas and air lines and to control instruments, they are strictly portable. Gas consumption has been reduced by utilization of insulation.

An air curtain is provided at each furnace door for protection of the operators and serves to cool the door and door frame castings. With controlled gas firing working conditions are improved, the shop being free from soot, scale and cinders.

In conclusion Mr. Steever said that if gas modernization is carefully studied, improved quality product and quantity will in most instances more than pay the costs.

### Heating of Liquids

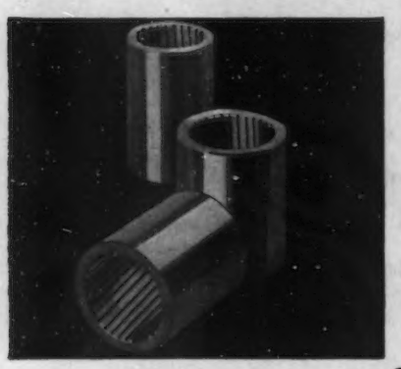
Of interest to the steel industry was a paper on heating liquids by submerged combustion by C. H. Lekberg, Northern Indiana Public Service Co., Hammond, Ind. Explaining that a submerged combustion unit differs from immersion unit in that in the former the products are vented into the liquid instead of being entirely separated from the liquid, he said that after seven years development of a burner a satisfactory submerged combustion system has been developed in the territory served by his company and this burner is now ready for the market.

The speaker described this combustion system and said that submerged combustion may be used to heat and agitate many types of cleaning solution and that one of its most practical applications is in pickling of steel.

In the removal of scale from steel the speaker pointed out the rate of removal is in almost direct proportion to the rate of agitation which may be accomplished either by moving the work within the solution or moving the solution about the work. By using submerged combustion the pickling solution, usually sulphuric acid, is agitated and moved about the tank at a rate that would probably be impossible to attain mechanically. This agitation keeps the temperature practically uniform at any part of the tank. Another advantage of submerged combustion for pickling, according to the speaker, is its flexibility. Each pickle tank in a plant can operate as an independent unit, not depending upon a central heat generating system.

The production rate of a pickling tank, Mr. Lekberg claimed, can generally be increased 100 per cent by submerged combustion and the average pickling time on various grades of steel will be from 30 to 60 per cent of the usual practice if the operating temperature of the tank is the same with submerged production as it is with steam. The same rate of production can be attained with 140 deg. temperature, using submerged production that is attained with 180 deg. on steam. One steel plant during the fiscal year ended April, 1937, showed a production increase of 104 per cent by using submerged combustion instead of steam.

Increased production with the submerged combustion system is due, according to the speaker, not only to the terrific agitation produced by the system but because the solution is not diluted by steam. In practice with submerged combustion only enough acid is added to replace that used in the chemical reaction of the acid and steel and it is only necessary to add water to maintain the desired solution

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level. This, he claimed, effects a saving in acid use from 25 to 50 per cent. Another advantage, he pointed out, is that the high rate of agitation breaks down the formation of hydrogen bubbles before they are of measurable size, thus exposing the entire steel surface to the action of the acid and producing a more uniform surface and eliminating all spotty work.

The speaker said that one steel plant in his territory in the past year saved 72c. per ton on all steel pickled by submerged production and is installing additional equipment in order to do all its pickling and solution heating with the submerged combustion system.

**Other Speakers**

Mr. Lekberg's paper was presented during an industrial gas and equipment forum. Among other speakers at this forum was Homer T. Hood, Battle Creek Gas Co., Battle Creek, Mich., who reported an experience with an immersion heated cleaning tank and outlined the heat requirements of a Niagara type washer.

"What Industrial Gas Men Should Know About Steel," was the subject of a paper at another session presented by Robert G. Guthrie, People's Gas, Light & Coke Co., Chicago. The principal thing that an industrial gas man should know about steel is cooperation, the speaker held. The gas man should first learn the fundamentals of making, shaping and heat treating steel and from that point on he should cooperate with the steel company field experts who are highly specialized men and who want the best fuel for the product. The steel man, he said, wants a fuel that is most easily controllable, costs the least and has other advantages and he is always ready to cooperate with the industrial gas man.

Gas unit heaters were discussed by J. F. Quinn, Brooklyn Union Gas Co., Brooklyn. Modern methods of applying gas in large power boilers was the subject of a discussion by L. S. Reagan, Webster Engineering Co., Tulsa, Okla.

V. W. Conover, U. S. Steel Corp., New York, gave an informal talk on practical attitudes toward industrial relations at a luncheon conference of the committee on personnel practices.

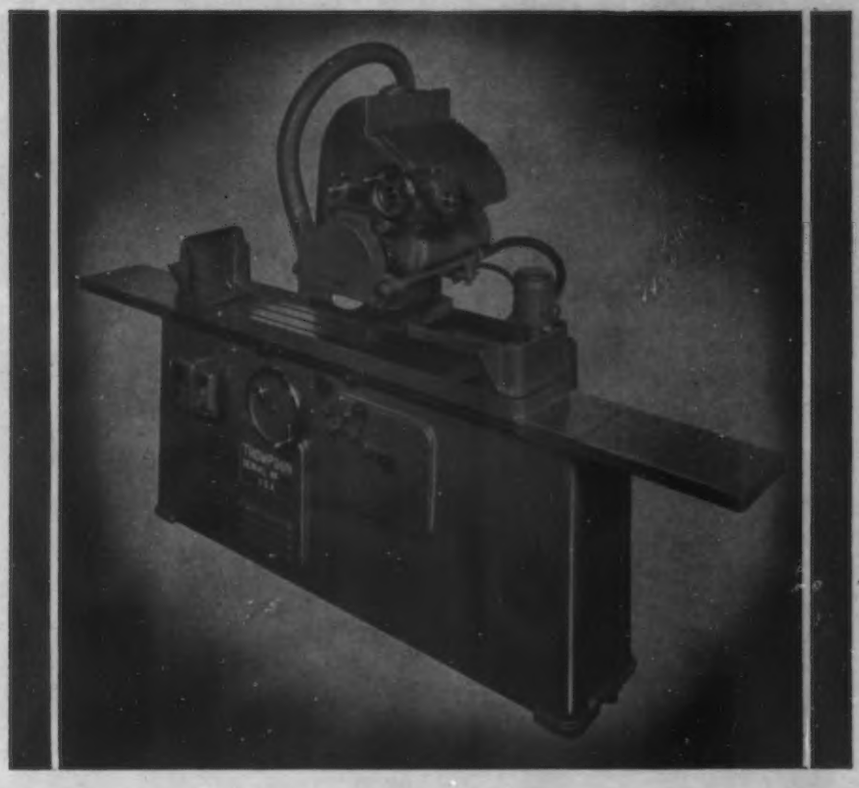
At the second annual meeting of the Association of Gas Appliance and Equipment Manufacturers, Merrill N. Davis, executive vice-president and secretary S. R. Dresser Mfg. Co., Bradford, Pa., was elected president; E. R. Guyer, vice-president Cribben & Sexton Co., vice-president, and Donald McDonald, secretary American Meter Co., was reelected treasurer.

## Safety Leaders Honor Late C. L. Close

IN memory of Charles L. Close, one of the organizers of the National Safety Council and former manager of safety, sanitation and welfare activities of the United States Steel Corp., a wreath was placed on the grave of Mr. Close in Marion, Ohio, Sept. 30, the twenty-fifth anniversary of the formation of the Safety Council.

Attending the ceremony were representatives of U. S. Steel Corp., National Safety Council, members of the Marion Chamber of Commerce and of the Boy Scouts.

Brief remarks were made by Homer J. Weeks, safety, sanitation and welfare director of the American Steel & Wire Co., Cleveland, and by Steven Tener, now retired, who was Mr. Weeks' predecessor in charge of American Steel & Wire Co. safety work.

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And you also get—in Thompson Hydraulics—faster table speeds and feeds permitting the use of harder wheels producing finishes not obtainable formerly except by the expenditure of much time and patience.

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# Iron and Steel Engineers Meeting Well Attended; Exposition and Technical Papers Are Features

ONE of the largest and best conducted conventions in recent years ended last Friday afternoon, when the Association of Iron and Steel Engineers closed its 33rd annual meeting at the Stevens Hotel in Chicago.

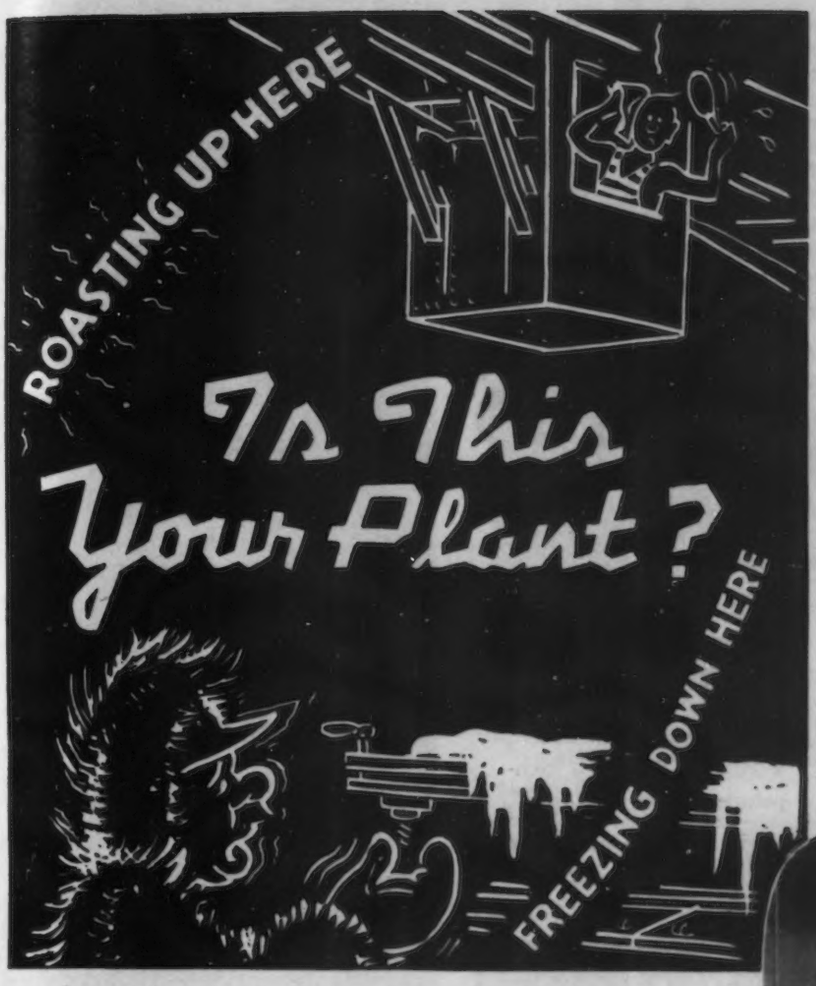
Total registration exceeded 3500, and more than 8000 engineers and guests visited the exhibits of 157 companies in the Iron and Steel Exposition held in the hotel in conjunction with the convention. Over 800 members of the association made an inspection trip to the Gary sheet and tin plate division, Carnegie-Illinois Steel Corp., and 500 journeyed to Indiana Harbor, Ind., to view the hot and cold strip mills of Inland Steel Co.

### Features of Exposition

Prominent among the exhibits, which not only filled the exposition hall below the lobby of the hotel, but also overflowed the grand ballroom on the second floor, were those of Allis-Chalmers Mfg. Co., Milwaukee, which had on display a grid-controlled power rectifier, the first of which to be installed in an American steel mill is now in use in the new wire mill at the South Chicago works of Republic Steel Corp.; Timken Roller Bearing Co., Canton, Ohio, which showed a bearing from a back-up roll on the 76-in. four-high hot strip mill at Inland Steel Co. that had rolled 1,865,382 gross tons of steel, had never been repaired and was to return to service following the show; Automatic Transportation Co., Chicago, featured several of its coil tractors and sheet handlers in a large exhibit; Mathews Conveyor Co., Ellwood City, Pa., had an attractive booth, where its new principle of spring-mounted roller conveyors was featured; Baker-Raulang Co., Cleveland, Elwell-Parker Electric Co., Cleveland, Lewis-Shepard Co., Boston, Barrett-Cravens Co., Chicago, and the truck division of Clark Equipment Co., Buchanan, Mich., all showed truck and jack types of materials handling equipment.

The large exhibit of Linde Air Products Co., New York, featured a new ox-weld shape cutting machine; United Engineering & Foundry Co., Pittsburgh, displayed a model billet shear and roll stand, and a slide rule for setting strip mill roll passes; and the General Electric Co. and Westinghouse Electric & Mfg. Co. had large booths where interesting types of their respective equipment, steel mill and otherwise, were shown. Among other large exhibitors were the Clark Controller Co., Cleveland; Electric Controller & Mfg. Co., Cleveland; Mesta Machine Co., Pittsburgh; Reliance Electric & Engineering Co., Cleveland; Cleve-

A BANQUET was one of the features of the 33rd annual meeting of the Association of Iron and Steel Engineers in Chicago.

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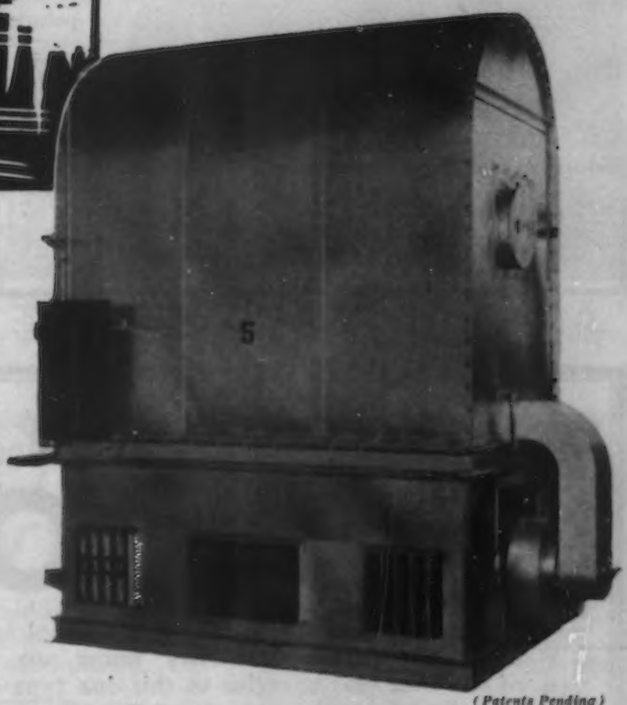

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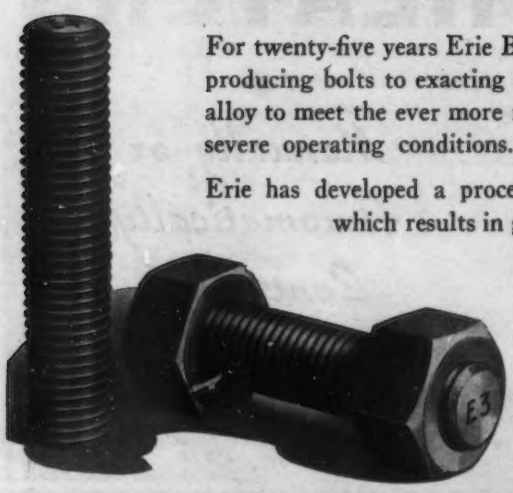
land Worm & Gear Co., Cleveland, and Cutler-Hammer, Inc., Milwaukee.

For socially inclined engineers, the association included in its program an exhibitors' dance and a formal banquet, followed by a dance. The program of the banquet was arranged to commemorate the 25th anniversary of the founding of the National Safety Council, the original movement toward the establishment of which was fostered by the association, which also adopted the resolution for the formation of the original optional committee at its annual meeting in Milwaukee, 1912.

The chief speaker at the banquet was John A. Stephens, industrial relations manager, Chicago district, Carnegie-Illinois Steel Corp., who substituted for L. H. Burnett, vice-president, Carnegie-Illinois Steel Corp., who was ill. Mr. Stephens, in tracing the history of the


# ERIE BOLTS



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Write for two new close tolerance thread specifications developed by Erie.

ERIE BOLT & NUT CO.
ERIE, PENNSYLVANIA

H. G. R. BENNETT
President of the association 1936-37 is assistant general superintendent of Carnegie-Illinois Steel Corp. at Duquesne, Pa.

L. F. COFFIN
First vice-president of association 1936-37 is superintendent of the mechanical department of Bethlehem Steel Co. at Sparrows Point, Md.


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*The Tubing Specialists*
**Cleveland, O.**

safety movement, mentioned that in 1906 the first "real concerted safety movement" began, "when the United States Steel Corp. and other leading corporations launched a vigorous campaign against industrial accidents. The first great technical association to appoint a safety committee," he continued, "was the Association of Iron and Steel Electrical Engineers, formed in 1907. Your association was among the first to engage in organized safety work, devoting your time and energy especially to the elimination of hazards involved in electrical operation of steel mills.

"The National Safety Council was not only founded and organized by the iron and steel industry," Mr. Stephens said, "but fostered and financed, until it became well and firmly established. The metals section of the council is among the largest and most active today and some of its important contributions to the industry have been the compilation of safe practice pamphlets; the furnishing of reliable accident statistics; the promotion and formation of safety codes; and the establishment and maintenance of local councils."

Mr. Stephens mentioned in his address some of the requisites for a safe plant and pointed out that making plants and processes safe is becoming more and more a real engineering job. A man working in an industrial plant today is safer than when on the highways, he said, and has become a preferred risk for life insurance. Since safety work was introduced in plants of the United States Steel Corp., Mr. Stephens went on to say, serious and fatal accidents have been reduced 62 per cent and more than 78,000 employees have been saved from serious injury and death.

Abstracts from the technical sessions of the meeting, which included addresses and discussions by 25 leading men in the field of iron and steel engineering are published in this issue beginning on page 36.

W. A. PERRY

Second vice-president of the association 1936-37 is superintendent of electrical and power department of Inland Steel Co. at Indiana Harbor, Ind.

Perforated Metals

Regardless of your problems, whether they demand the screening of very fine and treacherous materials such as minerals, chemicals and other similarly hard-to-screen products or your requirements include grilles for use where beauty is a major consideration, you will find H. & K. perforations particularly suited to your purpose. Send us your specifications and permit us to prove H. & K. standard of accuracy and lasting performance.

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DENVER
SAN FRANCISCO

# New Furnaces Give Steel Makers Better Production Control

(CONTINUED FROM PAGE 55)

ments in furnace and combustion chamber design and from the utilization of insulation. Insulation has also contributed substantially to the comfort of hammer crews working near the furnace.

An air curtain is installed at each door for protection of the operators. This curtain also serves to cool the door and door frame castings. The furnaces operate at a slight positive pressure, which is the result of the measures taken to control atmospheres. A propane standby has been installed, which makes it possible to change over to substitute fuel at any time without interruption or furnace adjustments.

### Tends Toward Cleanliness

Incidental to this furnace practice, but important in the opinion of the management, is the fact that the controlled gas firing makes possible a floored, lighted, comfortable, clean shop free from soot, scale and cinders. All furnaces and equipment such as rolling mills, hammers, shears, etc., are kept in a clean aluminum-painted condition, all of which is conducive to the new standards of workmanship required.

"It is certainly true that modernization often carries added expense for some time after new equipment has been installed due to required attention and duplication," Mr. Clarage said, "but we have found that when the modernization is done in accordance with the right principles, the plant operator can depend on improvement of product, quality and quantity with a drop in operation and maintenance costs which more than pays for the new equipment. In the manufacture of good tool steel it seems to me that the best equipment and methods are a good investment in every way."

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For greatest strength with light weight, aviation engineers specify forgings of special metals... and modern forge shops produce many of these tough, strong forged parts on Erie Steam and Board Drop Hammers... 35 years of constant improvement in hammer design... 35 years of intense study of forge shop practice are built into today's Erie Hammers... 500 forge men with special needs or straight production requirements can turn to Erie with confidence. What is your requirement?
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DETROIT
CHICAGO
INDIANAPOLIS
FRANCE
CANADA
ENGLAND

# On the Assembly Line

(CONTINUED FROM PAGE 63)

of any possible exposure to lead poisoning. Recently I learned of a claim for silicosis in a dancer predicated upon the assumption that tap dancing stirred up enough dust to produce the disease."

Others who participated in this forum were Dr. Stuart F. Meek and Dr. Gordon Harrold, of the Chrysler Corp., who discussed "Making an Industrial Hygiene Survey." Dr. Clarence D. Selby, medical consultant, advised supervisors and engineers on the elimination of occupational disease hazards.

The statement of the UAW Medical Institute, made independently and not in connection with the Safety Council meeting, claimed that 25 per cent of the first 300 persons examined by the institute were suffering from occupational skin diseases, but conceded that the majority of those examined by

the union physicians were sent to the institute because they had some evidence of an ailment. Impartial observers believe that the most important promise of the institute is that after its organization is functioning as intended, it will be able to examine 5000 workers a year, picked at random. In other words, Dr. Frederick Lendrum, its director, is aiming at a research program that actually will present a cross section of the health of industrial workers. Through the work already done by the institute, however, it has been found that lead poisoning in the big automobile plants is well under control at present. Since steps have been taken to eliminate this hazard only one fresh case of lead poisoning has been discovered, according to the UAW physicians. The skin diseases are rapidly coming under control through proper industrial hygiene, he said.

## Todd Shipyards Corp. Leases Tebo Yard

TODD SHIPYARDS CORP., New York, has leased on a long term basis the Tebo plant of the Robins Dry Dock & Repair Co., Erie Basin, Brooklyn, to the Sullivan Dry Dock & Repair Corp., one of the oldest shipyards in the Port of New York. The Tebo plant provides modern facilities for repairing yachts and commercial vessels and has five floating docks with lifting capacities up to 5000 tons.

William H. Smith, who has handled the yard's yacht business for many years, has resigned from the Todd company to join the Sullivan organization.

It is the intention of the Todd Shipyards Corp. to expand the facilities of the Robins company at Erie Basin, where the corporation's business will be concentrated.

## Steel Operations in France Decline

DURING August, there was a noticeable slowing down in the steel industry in France, owing to a large extent to the closing of the automobile factories, according to the U. S. Bureau of Foreign and Domestic Commerce.

Even in July the reduced activity was beginning to be felt; total steel production during that month amounted to 680,000 metric tons, as compared with 685,000 tons in the previous month. Production for the first seven months, however, amounted to 4,610,000 metric tons, as against 3,899,000 for the similar period in 1936. The National Committee for Price Control permitted the factories to introduce 8 per cent higher prices as from Sept. 1, not including the increased shipping charges, to be paid by purchasers.

For the first time since 1929, the number of blast furnaces in operation outnumbered those inactive. Since the month of September, 1936, the number of active blast furnaces increased from 80 to 107. Production figures at the same time have increased, although August showed a slight decline in activity. Exports of pig iron have risen 174 per cent when compared with 1936, with shipments of 216,000 metric tons for the first seven months of 1937 as against 78,900 for the same period of 1936. At the same time imports of Dutch pig iron have declined.

Pig iron production totaled 697,000 metric tons in July, as compared with 685,000 in June and 519,000 in July, 1936.


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Send for test samples. Specify width, gauge, temper and finish desired.

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Specialized Producers of Cold Rolled Strip Steel

# Rustless Iron Mill Viewed by 300; George M. Verity a Principal Speaker

GEORGE M. VERITY, chairman of the American Rolling Mill Co., Middletown, Ohio, whose company owns a large interest in the Rustless Iron & Steel Corp., Baltimore, was one of the principal speakers at a luncheon which preceded the formal opening of the enlarged Rustless mill to about 300 visitors on Thursday, Sept. 30.

Referring to the struggles that the Rustless company has had through years of depression and through patent litigation before reaching its present status as the country's largest exclusive producer of stainless iron and steel, Mr. Verity said:

"A study of the history of our industrial growth will show that those who started the smallest and often with the least of financial support, those who have had to struggle to the limit of the ability of their creators and managers, those who have had to fight every foot of the way along the road of progress, have in time been numbered among the largest and strongest of our great industrial enterprises.

"Those who have given any attention to the study of human nature, human psychology and human urges and aspirations, know that it is the struggle which must be made to create and develop an industry that evolves the strength and creates the experience necessary to its ultimate success.

"If the problems associated with the creation of a new industry were simple and easy, if abundant capital, was always available, the managers and workers required in its conduct could not possibly develop the fiber, the strength and the ingenuity that must come from an insistent urge to maximum effort.

"While our great industrial institutions of today, as trail blazers and developers, have been traveling the road of discouragement, of many disappointments, of both tragic and happy experiences and of steady accomplishment through it all, they have done more than merely to create great units of real estate, machinery and equipment and to make marvelous development in new products of high quality; they have created an entirely new field of human effort and development and a higher standard of individual living than was ever known or attained throughout all the thousands of years of world history.

"Our American industrial development has not only been replete with opportunity for individual progress—it has absolutely demanded such progress; in other words, individual intiative, courage and resourcefulness had to come into life and be greatly stimulated in advance of the practical scientific and economic accomplishments that have been recorded.

"The whole standard of the earning capacity of the men engaged in industry, from the humblest to the highest, has been so astoundingly advanced that, like all the wonders of our time, we cease to marvel at it.

"We have here in the company whose accomplishments and progress we are witnessing and celebrating today just another example of how our American industry has come into life and how it has developed into something essential to our growing civilization. If travail and struggle are the forerunners of strength and accomplishment, this enterprise has been well founded."

C. E. Tuttle, chairman and president of the Rustless Iron & Steel Corp., welcomed the guests to the luncheon at the Belvedere Hotel, Baltimore, and introduced the speakers, who, besides Mr. Verity, were Mayor Howard W. Jackson of Baltimore, General Henry M. Warfield, president of the Baltimore Association of Commerce and Charles S. Payson, a director of the Marine Midland Trust Co., New York.

"Our position in the steel industry," said Mr. Tuttle, "is unique because we employ somewhat unorthodox processes developed by ourselves and because, with possibly one exception, we are the only commercially operating manufacturer in the world whose operations are directed solely to the manufacture of rustless or stainless irons and steels. There are, of course, other manufacturers of stainless who employ other processes and whose operations form a division of their other steel operations."

As stated in THE IRON AGE of Sept. 30, p. 60, the expansion of its facilities, which was the occasion for the formal celebration last week, has brought the annual capacity of the Rustless company up from 20,000 tons to 40,000 tons of stainless ingots. Some of this material is sold to other companies in the form of ingots, billets or rods for further processing. The Rustless company in its finishing operations confines itself to bar and wire products, with no production of flat rolled material. One of the additions to the plant will be largely devoted to cold drawing operations and to the warehousing of bars in all sizes and shapes for quick distribution to customers, many of whom are jobbers.


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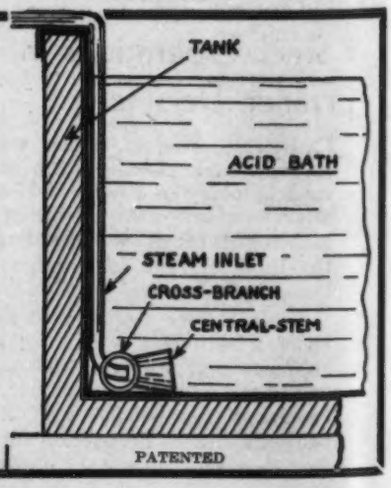

# Minnesota's New Ore Mining Tax Lifts State's Income $3,000,000

THREE million more dollars will flow into the Minnesota State treasury this year than last as a result of new taxes on iron ore.

Since 1921 the ore mining industry in Minnesota has been paying heavy tribute to the State through an occupational and royalty levy.

This tax, easily collectible, proved such a gold mine to the State that its legislators in June increased the rate of the tax two thirds.

The so-called occupational tax is a percentage of the value at the mine of the ore produced. This value is the selling price of ore at lower lake ports less transportation costs, labor, mine supplies, etc., and is fixed by the State Tax Commission, which has full authority to say what the ore is worth at the mine.

### Fee Owners Caught

Fee owners also are caught in this tax net for hitched to the occupational tax is a tax of the same percentage on what the fee owners receive in royalty. Fee owners cannot dodge any of this royalty because it is collected from the mine operators who pay the fee owners what is due them after the deduction of the royalty tax.

The occupational and royalty tax from 1921 to 1936 was 6 per cent of the value of ore at the mines. This was increased to 10 per cent in the amended tax law, which, while enacted late in June, was made retroactive to cover all ore mined in 1937. The amended law promises a 20 per cent reduction in the present occupational and royalty tax rate next year, as it specifies that after 1937 the rate shall be 8 per cent instead of 10 per cent. However, mine operators fear that the Legislature before another shipping season rolls around will reconsider the matter and allow the 10 per cent tax rate to remain in effect. Should the reduction to 8 per cent be made, the tax still will be 33⅓ per cent higher than in 1936.

### Average 8.6 Cents

The average occupational tax collected on all ore mined in Minnesota from 1921 to 1929 inclusive was 8.6c. per ton. In 1936 the occupational tax was 8c. per ton and the royalty tax 2.3c. per ton, making a total tax of 10.3c. In addition to this tax is the ad valorem tax of 53.3c. a ton, which is unchanged, making a total tax last year of 63.6c. per ton. Ore mined in Minnesota last year paid approximately $2,700,000 in occupational taxes and $760,000 in tax on royalties, these being approximate figures, and $18,012,178 in ad valorem taxes, or a total of approximately $21,472,178.

Assuming that ore shipments this year reach 65,000,000 tons and Minnesota mines produce 75 per cent of the total as they did last year, shipments from Minnesota in 1937 will be approximately 48,000,000 tons. If last year's occupational and royalty taxes were unchanged, these this year would be $4,800,000 using a round figure of 10 cents a ton tax, but with the 66 2/3 per


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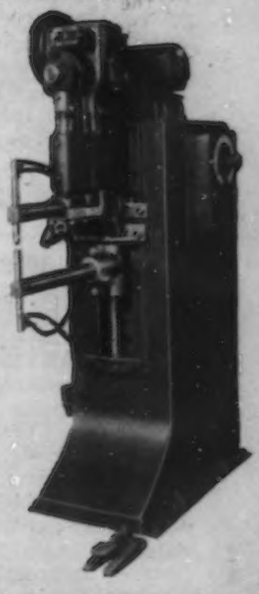

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cent increase in these taxes they will amount to $8,000,000.

Thus it appears the State with its increased tax rate will take $3,200,000 more from the ore mining industry in Minnesota this year than it would, had the occupational and royalty tax not been boosted.

With the increase in the occupational and royalty tax rate, Minnesota ore taxes this year will be 70.46c. a ton if figured on the basis of 1936 taxing values. This means an increase of nearly 7c. per ton or nearly 11 per cent above the 1936 tax cost.

## U. S. Steel Workers' Policies $474,874,500

INCREASES in both payrolls and number of employees of United States Steel Corp. and subsidiaries in the past several years resulted in a monthly gain in the subscriptions of employee group insurance to $474,874,500 through June 30 last, the corporation announced.

Under the plan, inaugurated July 1, 1935, more than $5,700,000 has been paid out in death claims, or an average of $1,733 on each of the 3298 claims adjusted. During the plan's last fiscal year, ended June 30, 1937, such claims amounted to $3,344,500, or an average of $1,772 for each of the 1887 claims paid. This compares with $2,373,200, or an average of $1,681 for the 1411 claims in the preceding like period.

By the close of the second policy year, there were roughly 240,000 participants in the plan or more than 88 per cent of all workers then employed. When the group insurance went into effect, 177,737 employees took out $293,277,000 of protection.

## Boake Carter to Talk At S.A.E. Dinner

BOAKE CARTER, Philco's famous news commentator, is to be the principal speaker at the 1937 annual dinner of the Society of Automotive Engineers, to be held at the Hotel Commodore, New York, Oct. 28. W. J. Davidson, general sales manager of the Winton Engine division of General Motors Corp. and formerly technical director of the corporation, is the toastmaster. This annual event, which always draws a large and distinguished group of diners, is the high spot of New York Auto Show week.

## Electrochemists Will Meet in St. Louis

THE opening session of the annual meeting of the Electrochemical Society, to be held in St. Louis, Oct. 13 to 19, will be devoted to "Automatic Electrochemical Control of Chemical Manufacturing Processes." G. A. Perley, Leeds & Northrup Co., will preside.

The second session, under the chairmanship of J. W. Marden of Westinghouse Lamp Co., will cover "New Static Devices for Furnishing Direct Current for Electrochemical Processes." Particular emphasis will be laid on recent developments in large-scale copper oxide rectifiers and the new mercury rectifiers using boron carbide ignitrons.

Presentation of the Acheson Medal and $1,000 prize for outstanding contribution to the field of electrothermics will be awarded to Dr. Frederick M. Becket, Electro-Metallurgical Corp., on Friday morning.

On Saturday, in addition to papers on tin, zinc, copper and nickel which will be read, Dr. W. S. Landis will discuss his experience with the new process of producing magnesium metal in the electric furnace.

## Factory Expansion Has not Been Halted

THE continued high rate of industrial construction, as reflected in September business of the Austin Co., Cleveland industrial engineer and builder of factory buildings, is cited by that company as forceful evidence of the basic soundness of the current business situation. This company reports that during the past three weeks it has received 12 contracts for factory buildings in 10 different industries, coming from almost every section of the United States and Canada.

George A. Bryant, Jr., executive vice-president of the Austin Co., states that increased earnings reported by leading corporations having the advantages of operating up-to-date plants, have stimulated the general resumption of plant building, which is now approaching the all-time high of 1929. The Austin Co. has work sufficient to keep its structural shops in Cleveland operating at capacity into 1938.

Provisions for air conditioning are included in 15 plants now under construction by the Austin Co., which is building factories for four companies in the air conditioning field.

"Air conditioning and automobile parts plants, factories for the manufacture of office equipment, glass, acetylene gas, paper and cans are included among the contracts recently signed", stated Mr. Bryant.

"With others for the building material, petroleum, food and industrial rubber goods industries they indicate a well-balanced situation in which both consumer and capital goods industries are looking forward to continued growth in the volume of business.

"Obviously, if the executives who signed these contracts had been in any great doubt about the future they would have at least delayed these major improvements, which involve several millions of dollars in expenditures for plant and equipment.

"Inquiries from manufacturers in the heavy industries are still forthcoming in substantial numbers and the release of contracts from such sources will probably place our year's domestic business volume equal to or above the highest year in our history."

## Spicer Nominated for S.A.E. Presidency

C. W. SPICER, vice-president Spicer Mfg. Corp., Toledo, has been nominated for the presidency of the Society of Automotive Engineers for 1938. David Beecroft, Bendix Products Corp., South Bend, Ind., has been nominated treasurer. Nominees for councilors are: W. J. Davidson, general sales manager Winton Engine Co., Cleveland; L. J. Grunder, automotive engineer Richfield Oil Co. of Cal., Los Angeles; and B. J. Lemon, tire engineer U. S. Rubber Products, Inc., Detroit.

## Fabricated Plate Below 1936 Orders

NEW orders for fabricated steel plate turned upward from 27,480 net tons in July to 30,212 in August, according to the Bureau of the Census. The August figure is below that of 31,999 tons for August, 1936, however, and the eight months' total of 308,937 tons for 1937 lags behind the comparable 1936 figure of 323,730 tons. The peak of activity was reached in March this year when 71,250 tons was booked. The lowest month was May, when bookings were 28,913 tons.

o o o

METALLURGICAL and chemical laboratory section of the new laboratory building of the Columbia Steel Co., Pittsburg, Calif.

o o o

# New Laboratory of Columbia Steel Co. Employs Unique Piping System

THE new metallurgical and chemical laboratory of the Columbia Steel Co., Pittsburg, Cal., subsidiary of United States Steel Corp. is perhaps one of the most complete for its size in the steel industry. Designed by the engineeering department at the Pittsburg works to afford maximum efficiency in technological work, it is equipped with all of the orthodox equipment of a modern metals laboratory, along with facilities for research on methods and products.

The two-story structure, with the first story partially imbedded in the ground, is 40 by 80 ft. in plan and has a total available working floor space of 4864 sq. ft. It is constructed of steel, brick and concrete, is absolutely fireproof, and includes many safety features. Acid fumes and heat are removed by means of an exhaust fan placed on the roof, and the lighting fixtures are of all-glass design as a precaution against corrosive deterioration. All partitions are of steel construction, insulated and soundproof.

The pipe line system in the new laboratory is unique by virtue of the variety of materials used for different lines. All pipe lines are concealed because the basement of the building is used for office and laboratory work. However, sections of the ceiling may be removed to gain access to the lines should it ever become necessary.

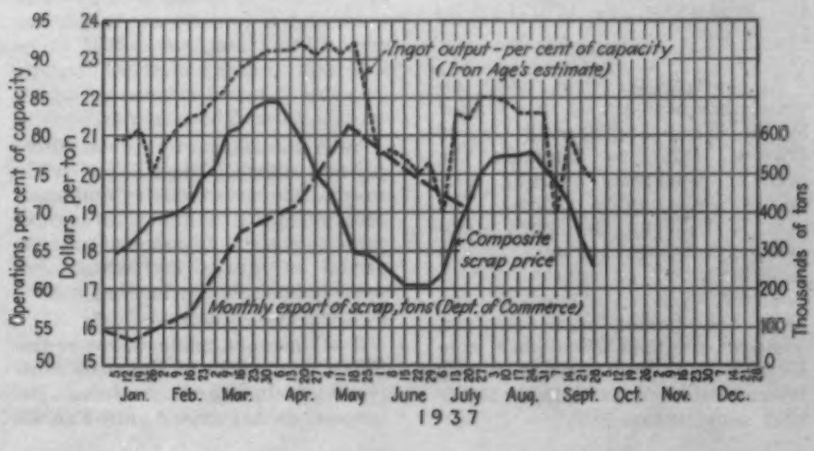
Handling of corrosive liquids by hand has been practically eliminated by the use of glass pipe lines. Extra heavy cast iron pipes carry away the waste water, except that containing acid solutions which is carried away in pipes of acid-resisting iron. Distilled water is piped through pure tin. Oxygen and vacuum lines are carried to all work benches in copper tubing, most of which is concealed by molding and therefore readily accessible. Air and gas are piped through welded steel lines.

The lower floor is used for physical testing. The equipment installed here includes a 200,000-lb. Riehle tensile testing machine, two Olsen bending machines, an Erichsen ductility testing machine, a Rockwell machine for testing surface hardness, and machines for testing other physical properties. The metallographic laboratory, which also handles general plant photography, a sample preparation room, storage vault, and offices for the testing engineer, chief inspector, and observer, are all located on the first floor.

A staff of 23 men carry on an average of 5000 determinations and tests each month under the direction of G. L. von Planck, chief metallurgist, and Howard Grafton, plant metallurgist of the Pittsburg works.

## *Scrap as a Forecaster of Steel Production*

THE accompanying chart has been prepared to show the relationship between the price of heavy melting steel scrap and the production of steel ingots. The barometric value of scrap prices in foretelling rises and falls in steel plant activity has not always worked out perfectly, but this year the relationship has been fairly accurate notwithstanding the fact that large export sales of scrap have frequently affected market prices quite apart from the normal


Ingot output - per cent of capacity
(Iron Age's estimate)
Composite scrap price
Monthly export of scrap, tons (Dept. of Commerce)
Operations, per cent of capacity
Dollars per ton
Thousands of tons
95 90 85 80 75 70 65 60 55 50
24 23 22 21 20 19 18 17 16 15
600 500 400 300 200 100 0
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1937

influences of the domestic steel situation.

In the early part of the year the rise in scrap prices was constant, advances having been recorded every week up to the end of March when a peak of $21.92 (THE IRON AGE composite price) was reached. Before mid-April scrap prices had turned downward, partly in anticipation of a summer lull in steel business and partly because of fears of steel strikes. When the strikes occurred (May 26) the market had dropped $4 from its previous peak, and before the end of the strikes there was a further gradual drop of 84c. a ton to the year's low point thus far of $17.08. A rise starting around the first of July reflected the increased operations brought about by resumption of work at mills that had been wholly or partially idle, and this upward swing continued until a secondary peak of $20.58 was reached in our issue of Aug. 26. The subsequent decline reflected revised opinions as to fourth quarter prospects for the steel industry. Before this time steel operations had begun to turn downward, though the declines did not become marked until September.

One of the lines in the chart shows the fluctuations of scrap exports, as reported monthly by the U. S. Department of Commerce. The decline in scrap exports shown in June reflects the reduced volume going to the Orient.

## Tin Plate Output Sets a New Record

WORLD production of tin plate in the 12 months' period ended July 31, 1937, established a new record at 4,066,000 tons, of which the United States produced 2,315,000 tons, or 57 per cent, according to the International Tin Research and Development Council. World tin consumption in July declined 290 tons to 14,700 tons, and production fell 1200 tons to 15,900 tons.

A construction field office on wheels has been set up in a trailer by the Wean Engineering Co., of Warren, Ohio, to eliminate the need of repeatedly building temporary construction offices. The unit, R. J. Wean, the firm's president reports, is used whenever a superintendent of construction is required. When the work is complete the trailer and tow car, equipped for field office work, conferences, blue print storage, survey instruments and tools, move to the next construction site.

# Closed Shop and Checkoff Are Likely To Be Next SWOC Demand

By JAMES A. ROWAN
*News Editor, The Iron Age*

EMPLOYERS may look during the next few months for renewed attempts by union labor to win closed shop agreements and the checkoff.

For a time, manufacturers in steel and other leading industries may look for temporary relief from demands for wage increases which swelled payrolls early this year.

This shift from the goal of lifting wages and salaries to the objective of obtaining the checkoff of union dues and other conditions aimed to strengthen the unions and establish them on a permanent basis, if possible, apparently is the strategy of America's present labor leaders.

William Green, president of the American Federation of Labor, busy combating John L. Lewis' Committee for Industrial Organization and working to expel its member unions from the AFL, apparently is willing to let the matter of higher wages for his supporters wait a more favorable business period.

Likewise the CIO unions, particularly the Steel Workers Organizing Committee, headed by Philip Murray, veteran United Mine Workers leader, are letting the wage issue rest since they are fighting the AFL on one hand, battling to push their membership totals to new highs, and, most important but least publicized, are striving to hold up a pronounced slipping in the rate at which union members have been paying dues.

### The Union Strategy

This strategy of holding off pay increase demands and stifling protests by individual union members over layoffs, a return to the 40 hr. week and a consequent disappearance of the time and a half overtime pay in many steel plants, apparently is keyed to several important factors. These are:

1—A realization by Lewis, Murray and other CIO and SWOC leaders that the steel industry and business generally is going through a rather severe readjustment after a period of prosperity which for some industries reached boom proportions early this year.

2—Contracts made between the SWOC and some of the steel companies, including three of the nine largest, do not expire until Feb. 28 and are not scheduled to be reconsidered until Feb. 7. Regardless of the trend of rents, food costs and other items most directly affecting steel workmen and their families, the SWOC is not in a position to discuss wages with the steel industry. (Any suggestion by high SWOC leaders that wages should be raised, or that something be found to compensate for loss of the overtime on a reduced volume of business, would be interpreted now as a move to break the SWOC-steel company contracts).

Already rubbed raw by charges, sometimes substantiated by the records, that they and other CIO leaders are irresponsible and so unfit for signing and observing contracts, the high SWOC leaders are not likely to mention higher wages until the February contract meetings with steel executives, and perhaps not then unless business has improved substantially by that time.

But union labor, even if sobered somewhat by the public's reaction to violence along strike fronts in recent months, intends to battle for the closed shop and other concessions such as a strict application of seniority and other issues which steel and other industries must prepare to face.

### Homer Martin's Warning

Warning industry that closed shop demands are imminent, Homer Martin, president of the CIO's United Automobile Workers of America, a few days ago told the New York Women's Trade Union League that the UAW will "not accept responsibility for uninterrupted production in automobile factories until the union has won closed shop contracts throughout the industry."

Mr. Martin, who recently acknowledged to General Motors the employer's right to discharge employes for unauthorized strikes and work stoppages, urged in his New York address that:

"Automobile companies cease regarding the union as a temporary irritation and regard it instead as a permanent factor with which collective bargaining must be carried on in good faith.

"And we are adamantly opposed," said Mr. Martin, "to the proposition that the differences between unions and corporations be

dragged through the courts. It is my conviction that the institutions furthest from concern with the rights of workers are made up of persons whose actions and decisions are governed from the precedents of the dead past."

This statement by the UAW leader, one of the latest clues for industry to what the unions are doing or plan to do, came during the AFL's anti-CIO convention at Denver in which the AFL's executive committee reported in regard to wages and hours that:

A—So far reaching has been the effect of the organizing drive this year that average hourly earnings in all recorded industries rose from 59c. in December, 1936, to 64c. in June, 1937, an average gain of 5c. an hr. In the previous two years hourly earnings rose only 2½c.

B—Workers have won in six months of union organization twice as great a gain as private industry had given them in two years and work hours have been shortened. The 40-hr. week is not yet won in industry generally, since the average is 40½ hr.

In an obscure paragraph the AFL executive committee did say that wage gains "since March, 1933, have in large part been cancelled by rising living costs."

In addition, the AFL report noted that the year 1937 appears to mark the beginning of a movement for vacations with pay for wage earners and that "member unions are urged to include a vacation clause in agreements whenever possible."

In any event, steel manufacturers and other mass production employers face a period in which the checkoff of union dues (collected by the employer for the union before the worker is paid), the closed shop and other objectives of the labor union campaigns will overshadow in importance the question of wages.

## Scrap Dealers Sign Contract With AFL

A STRIKE which tied up all scrap iron yards for the past week in Albany, Troy, Schenectady and other cities within a radius of 75 miles from the capital of New York State, was settled Oct. 4 when the scrap yards reopened under an agreement with the American Federation of Labor.

The labor agreement with the American Federation of Labor provides for a minimum wage of 45c. per hr, a 10 per cent increase for those receiving above the minimum and a 48-hr. week.

## Railroads Lift Pay, Await Order By ICC For Freight Rate Advance

THE nation's railroads this past week lifted wages of operating employees 6.6 per cent, effective Oct. 1, taking what some steel manufacturers consider a vital step toward resumption of railroad steel buying.

The increase averaged 44c. a day for approximately 250,000 train, yard service and engine employees and will cost the roads an estimated $35,000,000 annually, part of which will be made up when the Interstate Commerce Commission grants its expected general freight rate advance.

With the carriers in agreement on wages with the Big Five Brotherhoods, new petitions for freight increases are likely to be filed with the commission. Following such increases, expanding the railroads' ability to buy needed equipment, the steel industry anticipates a substantial gain in buying of steel.

A strike voted but never called apparently was averted by the brotherhood's agreement, announced by Dr. William M. Leiserson, of the National Mediation Board.

Position of the unions at the start of negotiations was contested by the railroads on the ground that business conditions did not justify granting of a 20 per cent pay rise demanded.

Important results of the rail wage contracts are likely to be abandonment by the unions of support for legislation limiting trains to 70 cars (costing the roads an estimated $150,000,000 yearly) and the modification of costly regulations limiting hours of work and mileage runs of employees.

## August Steel and Iron Exports at High Level; Scrap Increases Uses

WASHINGTON, Oct. 5.—While iron and steel scrap exports in August of the present year rose to 478,296 gross tons or 50,249 tons over the 428,047 tons shipped abroad in July they showed the third successive reduction in monthly shipments to Japan, which remains the chief foreign market for American old material. At the same time they reflected the continuous rise in exports to England, now the next to largest foreign market.

August scrap exports to Japan dropped to 207,185 tons from 210,608 tons in July while exports to England more than doubled, increasing to 144,260 tons in August from 67,988 tons in the preceding month. Shipments to Italy declined to 51,930 tons from 54,161 tons while shipments to Canada dropped to 21,939 tons from 23,411 tons and to the Netherlands there was a decrease to 19,807 tons from 7,938.

For the eight months ended August of the present year scrap exports aggregated 3,079,003 tons, an increase of 110 per cent over the 1,468,564 tons exported in the corresponding period of 1936.

The letdown in Japanese purchases of American scrap is attributed to three causes. First, it is believed that that country is pretty well supplied for the remainder of the year during which purchases are expected to continue to show a downward trend. Secondly, it is thought likely that Japanese overseas transportation services are curtailed in favor of immediate activities in China. Finally, it is thought Japan is responsive to considerable American sentiment against scrap exports, is apprehensive lest the American Government either embargo scrap shipments or reduce them under a licensing system. However, legislative proposals for either of these alternatives have met with resistance at the hands of the Department of State.

The rise in scrap exports to England is ascribed to the stress in the steel industry there for steel both for purposes of rearmament and industrial needs, particularly for the housing program.

Exports of pig iron and steel in August dropped to 408,023 tons from 461,421 tons in July but in the eight months of the current year rose to 2,239,521 tons, an increase of 198 per cent over the 749,320 tons exported in the corresponding period of last year.

August exports of pig iron were 114,035 tons, compared with 168,538 tons in July, while exports of ingots increased to 69,301 tons from 46,318 tons.

# FABRICATED STEEL

***. . . Lettings decline to 7900 tons from 18,115 tons last week.***

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***. . . New projects higher at 17,945 tons compared with 9215 tons a week ago.***

o o o

***. . . Plate awards call for 1620 tons.***

### NORTH ATLANTIC STATES

**Boston,** 400 tons, Northeastern University engineering building, to New England Structural Co., Everett, Mass.

**Orange, Mass.,** 110 tons, State bridge, to Bethlehem Steel Co.

**New York,** 150 tons, alterations to elevated railroad in Delancey Street, to Belmont Iron Works, Philadelphia.

**Glens Falls, N. Y.,** 115 tons, Glens Falls Hospital, to Bethlehem Contracting Co., Bethlehem, Pa.

**Erie County, N. Y.,** 135 tons, State highway bridge, to Lackawanna Steel Construction Corp., Buffalo.

**West New York, N. J.,** 240 tons, post office, to Selbach-Meyer Co., West New York.

**Linden, N. J.,** 600 tons, manufacturing building, Mather Spring Co., to Bethlehem Steel Co., Bethlehem, Pa.

**Clifton, N. J.,** 175 tons, warehouse, Clifton Paper Board Co., to Harris Structural Steel Co., Plainfield, N. J.

**Washington County, Pa.,** 130 tons, bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

**Wilmington, Del.,** 355 tons, Polytechnic High School, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

### THE SOUTH

**West Port Arthur, Tex.,** 480 tons, two oil heaters, to Mosher Steel Co., Dallas, Tex.

### CENTRAL STATES

**Dearborn, Mich.,** 115 tons, bench oven framing, Koppers Co., to Whitehead & Kales Co., Detroit.

**Dundee, Mich.,** 185 tons, bridge, to R. C. Mahon Co., Detroit.

**Vassar, Mich.,** 200 tons, bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

**Niles, Ohio,** 120 tons, bridge, to Fort Pitt Bridge Works Co.

**Chicago,** 350 tons, reconstruction of 18th Street bridge, to Strobel Steel Construction Co., Chicago.

**Kansas City, Mo.,** 2900 tons, Federal building, to Kansas City Structural Steel Co., Kansas City, Kan.

### WESTERN STATES

**Parco, Wyo.,** 1105 tons, Bureau of Reclamation project; 605 tons to St. Louis Structural Steel Co., 500 tons to Silver Roberts Iron Works.

## NEW STRUCTURAL STEEL PROJECTS

### NORTH ATLANTIC STATES

**New York,** 1600 tons, grade crossing elimination at Cypress Avenue, Southern Boulevard and Major William F. Deegan Boulevard in Bronx; bids to be received by president of Borough until Oct. 13.

**Brooklyn,** 525 tons, addition to Manual Training School; bids to be received until Oct. 11.

**New York,** 350 tons, Museum of Modern Art.

**Camillus, N. Y.,** 600 tons, grade crossing elimination, New York Central Railroad.

**New Rochelle, N. Y.,** 500 tons, New Rochelle College library building.

**Chautauqua County, N. Y.,** 610 tons, State highway bridge.

**Schoharie County, N. Y.,** 400 tons, State highway bridge.

**Niagara Falls, N. Y.,** 160 tons, Cataract theater remodeling.

**Belle Isle, N. Y. (near Syracuse),** 500 tons, New York Central grade crossing; bids taken Oct. 5.

**Scio, N. Y.,** 150 tons, centralized school.

**Weehawken, N. J.,** 1835 tons, viaduct, New Jersey approach, Lincoln Tunnel, contract MHT-24; bids to be taken by Port of New York Authority until Oct. 26. Contract also calls for 72 tons of cast steel and 14 tons of cast iron sections and pipe.

**State of New Jersey,** 250 tons, route 35, section 13, grade elimination; bids until Oct. 18.

**Hamburg, Pa.,** 5000 tons, finance building; bids Nov. 3.

**Selinsgrove, Pa.,** 250 tons, hospital; bids until Oct. 13.

**Pittsburgh,** 860 tons, stock house, Duquesne Brewing Co.

**Wilmington, Del.,** 450 tons, theater and office building, Old Time Petroleum Co.

### THE SOUTH

**South Washington, Va.,** 240 tons, Washington Brick Co. plant.

### CENTRAL STATES

**Muskegon, Mich.,** 725 tons, foundry and warehouse, Sealed Power Corp.

**Detroit,** 700 tons, State highway bridges.

**Detroit,** 230 tons, alterations to building No. 21, Chrysler Corp.

**Comstock, Mich.,** 280 tons, railroad and highway bridge, Consumers Power Co.

**St. Louis,** 140 tons, Marine Hospital; Foster & Creighton Co., Nashville, Tenn., general contractor.

**Wilmer, Minn.,** 128 tons, bridge; bids Oct. 8.

### CANAL ZONE

**Balboa, Canal Zone,** 1600 tons, superstructure of dock No. 15; bids to be opened Oct. 18 by general purchasing officer, Panama Canal, Washington.

## FABRICATED PLATES

### AWARDS

**Boston,** 260 tons, 42½-in. pipe for Boston Transit Department, to Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.

**Cleveland,** 550 tons, 24-in. pipe for West side main.

**Baton Rouge, La.,** 810 tons, coffer dams, Mississippi River bridge, to St. Louis Shipbuilding & Steel Co., St. Louis.

## SHEET PILING

### AWARDS

**Chattanooga, Tenn.,** 580 tons, TVA Chickamauga dam, to Carnegie-Illinois Steel Corp.

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# PERSONALS

JOHN HOWE HALL has resigned as technical assistant to the president of the Taylor-Wharton Iron & Steel Co., to go into business for himself as a consulting metallurgical engineer, specializing in steel foundry problems and in the manufacture of steels and irons for resisting severe wear and corrosion. Mr. Hall is widely known throughout the industry and is a frequent contributor to THE IRON AGE and other technical journals. His address is High Bridge, N. J.

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W. R. CUNNICK, Detroit district sales manager for Weirton Steel Co., has been made assistant vice-president, with offices in Detroit, in a series of personnel changes announced by the Weirton company.

❖ ❖ ❖

HERBERT V. THADEN has been appointed sales engineer in the stainless steel division of Carnegie-Illinois Steel Corp., Pittsburgh. He is an aeronautical engineer and will devote his efforts to the technical and business development of stainless steel products for aircraft use. For the past few years Mr. Thaden has been engaged in aviation sales work and specializing as a consultant on the economics of aircraft manufacture and operation. He had previously been an executive in General Aviation Corp. and in his own all-metal airplane manufacturing establishments.

❖ ❖ ❖

H. L. BRINDLE, whose appointment as acting general superintendent of Carnegie-Illinois Steel Corp.'s Edgar Thomson works, succeeding FRANK F. SLICK, was announced in the Sept. 9 issue of THE IRON AGE, has been given the title of general superintendent.

# Sept. Pig Iron Output Drops 2.3 Per Cent in Daily Rate

PRODUCTION of coke pig iron in September, at 3,410,371 gross tons, compares with 3,605,818 tons in August. The decline in the daily rate amounted to 2.3 per cent, or from 116,317 tons in August to 113,679 tons in September.

There was a net loss of 10 furnaces making iron on Oct. 1, the 181 furnaces operating at 110,260 tons daily, against 191 on Sept. 1, producing 115,420 tons daily. Eleven furnaces were blown out or banked and one was put in blast. The United States Steel Corp. took nine furnaces off blast. Independent producers took two off blast and put one in operation.

Among the furnaces blown out were the following: One Clairton, two Duquesne, one Edgar Thomson, one Ohio, one Farrell, and one South Chicago (new) of the Carnegie-Illinois Steel Corp.; the Ironton unit of the Columbia Steel Co.; a Fairfield furnace of the Tennessee Coal, Iron & Railroad Co.; a Brier Hill unit of the Youngstown Sheet & Tube Co., and a Wierton furnace of the National Steel Corp.

The only furnace put in blast was a Haselton furnace of the Republic Steel Corp.

**Daily Average Production of Coke Pig Iron**

*Gross Tons*

| | 1937 | 1936 | 1935 | 1934 | 1933 |
|---|---|---|---|---|---|
| January | 103,597 | 65,351 | 47,656 | 39,201 | 18,348 |
| February | 107,115 | 62,886 | 57,448 | 45,131 | 19,798 |
| March | 111,596 | 65,816 | 57,098 | 52,243 | 17,484 |
| April | 113,055 | 80,125 | 55,449 | 57,561 | 20,787 |
| May | 114,104 | 85,432 | 55,713 | 65,900 | 28,621 |
| June | 103,584 | 86,208 | 51,570 | 64,338 | 42,166 |
| ½ year | 108,876 | 74,331 | 54,138 | 54,134 | 24,536 |
| July | 112,866 | 83,686 | 49,041 | 39,510 | 57,321 |
| August | 116,317 | 87,475 | 56,816 | 34,012 | 59,142 |
| September | 113,679 | 91,010 | 59,216 | 29,935 | 50,742 |
| October | ..... | 96,512 | 63,820 | 30,679 | 43,754 |
| November | ..... | 98,246 | 68,864 | 31,898 | 36,174 |
| December | ..... | 100,485 | 67,950 | 33,149 | 38,131 |
| Year | ..... | 83,658 | 67,556 | 43,592 | 26,199 |

**Production of Coke Pig Iron and Ferromanganese**

*Gross Tons*

| | Pig Iron* | | Ferromanganese† | |
|---|---|---|---|---|
| | 1937 | 1936 | 1937 | 1936 |
| January | 3,211,500 | 2,025,885 | 23,060 | 24,766 |
| February | 2,999,218 | 1,823,706 | 24,228 | 24,988 |
| March | 3,459,473 | 2,040,311 | 27,757 | 22,725 |
| April | 3,391,665 | 2,403,683 | 26,765 | 19,667 |
| May | 3,537,231 | 2,648,401 | 34,632 | 18,363 |
| June | 3,107,506 | 2,586,240 | 34,415 | 17,549 |
| ½ year | 19,706,593 | 13,528,226 | 170,857 | 128,058 |
| July | 3,493,858 | 2,594,268 | 23,913 | 20,205 |
| August | 3,605,818 | 2,711,721 | 29,596 | 20,658 |
| September | 3,410,371 | 2,730,293 | 26,100 | 15,919 |
| October | ..... | 2,991,887 | ..... | 19,805 |
| November | ..... | 2,947,365 | ..... | 24,368 |
| December | ..... | 3,115,037 | ..... | 25,715 |
| Year | ..... | 30,618,797 | ..... | 254,728 |

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

**Merchant Iron Made, Daily Rate**

*Tons*

| | 1937 | 1936 | 1935 | 1934 | 1933 |
|---|---|---|---|---|---|
| January | 16,106 | 10,537 | 3,926 | 7,800 | 2,602 |
| February | 16,514 | 11,296 | 6,288 | 7,071 | 2,863 |
| March | 16,457 | 10,831 | 7,089 | 7,197 | 2,412 |
| April | 14,517 | 13,897 | 8,799 | 8,838 | 1,908 |
| May | 19,483 | 12,814 | 8,441 | 9,099 | 3,129 |
| June | 15,870 | 14,209 | 7,874 | 9,499 | 4,088 |
| July | 19,609 | 11,619 | 8,644 | 7,880 | 6,783 |
| August | 17,381 | 12,148 | 8,194 | 6,043 | 7,756 |
| September | 20,065 | 12,526 | 10,090 | 4,986 | 10,034 |
| October | .... | 13,645 | 11,199 | 5,765 | 8,634 |
| November | .... | 14,739 | 12,503 | 6,610 | 7,639 |
| December | .... | 14,852 | 13,312 | 4,399 | 8,358 |

**Production by Districts and Coke Furnaces in Blast**

| Furnaces | (Gross Tons) Production: September (30 Days) | (Gross Tons) Production: August (31 Days) | Oct. 1: Number in Blast | Oct. 1: Operating Rate, Tons a Day | Sept. 1: Number in Blast | Sept. 1: Operating Rate, Tons a Day |
|---|---|---|---|---|---|---|
| *New York:* | | | | | | |
| Buffalo | 239,055 | 238,946 | 12 | 7,970 | 12 | 7,860 |
| Other New York and Mass. | 38,768 | 40,459 | 3 | 1,290 | 3 | 1,305 |
| *Pennsylvania:* | | | | | | |
| Lehigh Valley | 85,286 | 89,928 | 6 | 2,845 | 6 | 2,904 |
| Schuylkill Valley | 39,065 | 40,933 | 3 | 1,300 | 3 | 1,320 |
| Susquehanna and Lebanon Valleys | 34,861 | 36,199 | 2 | 1,160 | 2 | 1,170 |
| Ferromanganese | ..... | ..... | 0 | .... | 0 | .... |
| Pittsburgh District | 701,939 | 769,455 | 34 | 22,525 | 38 | 24,820 |
| Ferro. and Spiegel | 21,652 | 23,646 | 2 | 720 | 2 | 670 |
| Shenango Valley | 65,607 | 70,882 | 3 | 1,565 | 4 | 2,285 |
| Western Pennsylvania | 117,609 | 102,719 | 7 | 3,920 | 7 | 3,630 |
| Ferro. and Spiegel | 11,611 | 11,548 | 2 | 385 | 2 | 375 |
| Maryland | 135,865 | 148,375 | 5 | 4,530 | 5 | 4,055 |
| Wheeling District | 145,545 | 173,590 | 7 | 4,850 | 8 | 5,600 |
| *Ohio:* | | | | | | |
| Mahoning Valley | 339,597 | 354,657 | 16 | 10,580 | 17 | 11,105 |
| Central and Northern | 292,486 | 317,358 | 16 | 9,750 | 16 | 10,235 |
| Southern | 57,675 | 55,077 | 5 | 1,925 | 5 | 1,875 |
| Illinois and Indiana | 696,363 | 718,815 | 30 | 22,555 | 31 | 23,355 |
| Michigan and Minnesota | 98,117 | 101,586 | 6 | 3,270 | 6 | 3,275 |
| Colorado, Missouri and Utah | 38,633 | 45,929 | 2 | 885 | 2 | 1,010 |
| Ferromanganese | ..... | 1,788 | 0 | .... | 1 | 60 |
| *The South:* | | | | | | |
| Virginia | ..... | ..... | 0 | .... | 0 | .... |
| Ferromanganese | 2,868 | 2,768 | 1 | 95 | 1 | 90 |
| Kentucky | 26,358 | 27,210 | 2 | 880 | 2 | 880 |
| Alabama | 221,411 | 233,950 | 17 | 7,260 | 18 | 7,545 |
| Ferro. and Spiegel | ..... | ..... | 0 | .... | 0 | .... |
| Tennessee | ..... | ..... | 0 | .... | 0 | .... |
| Total | 3,410,371 | 3,605,818 | 181 | 110,260 | 191 | 115,420 |

# NLRB Ruling Again Favors CIO Union

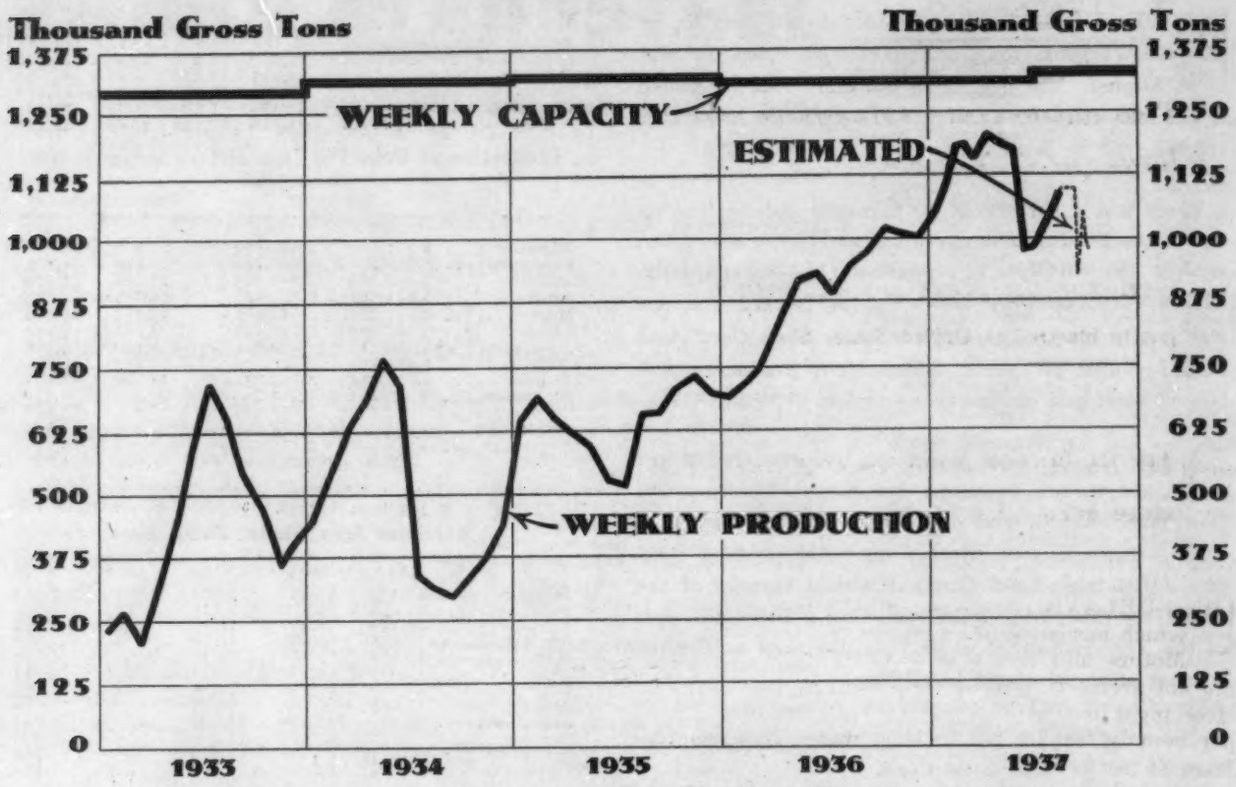
WASHINGTON, Oct. 4. — Faced by growing criticism that it favors John L. Lewis in labor disputes, the National Labor Relations Board last week studied a controversy in National Motor Bearing Co.'s Oakland, Cal., plant.

Ignoring a closed shop contract between National Motor and an AFL affiliate, a Labor Board examiner designated the United Automobile Workers, a CIO union, as bargaining agent for the Oakland plant's employees.

Tool and die workers membership in the plant is sufficient, the AFL contends, to give the AFL union an easy margin but the board examiner ruled only production employees may be included in the bargaining union. Company and AFL attorneys hold sentiment among the workers strongly favored the AFL when the plant closed one week last February after the CIO threatened a sit-down strike.

# PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937




Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

## STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

| | Current Week | Last Week |
|---|---|---|
| Pittsburgh | 61.0 | 69.0 |
| Chicago | 64.5 | 76.0 |
| Valleys | 60.0 | 70.0 |
| Philadelphia | 60.0 | 63.0 |
| Cleveland | 65.0 | 68.0 |
| Buffalo | 71.5 | 79.5 |
| Wheeling | 75.0 | 85.0 |
| Southern | 62.0 | 67.0 |
| Ohio River | 76.0 | 76.0 |
| Western | 65.0 | 65.0 |
| St. Louis | 67.0 | 74.0 |
| Detroit | 95.0 | 100.0 |
| Eastern | 62.0 | 62.0 |
| Aggregate | 66.0 | 74.0 |

## Weekly Booking of Construction Steel

| | Week Ended | | | | Year to Date | |
|---|---|---|---|---|---|---|
| | Oct. 5, 1937 | Sept. 28, 1937 | Sept. 8, 1937 | Oct. 6, 1936 | 1937 | 1936 |
| Fabricated structural steel awards | 7,900 | 18,115 | 24,400 | 13,900 | 864,110 | 845,830 |
| Fabricated plate awards | 1,620 | 1,775 | 925 | 2,625 | 88,535 | 183,510 |
| Steel sheet piling awards | 580 | 0 | 105 | 0 | 42,430 | 42,185 |
| Reinforcing bar awards | 4,400 | 6,225 | 3,200 | 4,555 | 217,630 | 278,920 |
| Total Lettings of Construction Steel | 14,500 | 26,115 | 28,630 | 21,080 | 1,212,705 | 1,350,445 |

# . . . .SUMMARY OF THE WEEK. . . .

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*. . . Two automobile companies place large orders for sheets.*

° ° °

*. . . General business poor, however; operations decline sharply.*

° ° °

*. . . 10 blast furnaces out in month; steel scrap hits low for year.*

LONG-DELAYED automobile buying of steel, which has come in large volume from General Motors and Chrysler, particularly in sheets, did not arrive in time to prevent a further dip in steel ingot output this week to an estimated 66 per cent of capacity in the country as a whole from 74 per cent last week. Apart from the automobile industry, from which further substantial orders are expected within the next week or two, current buying of steel is of the hand-to-mouth variety and in such small aggregate volume that there is still doubt as to whether the bottom of the production decline has been reached.

Having reached the end of their once large backlogs, the mills are now forced to make a rapid adjustment of operations in line with the volume of day-to-day orders. A few companies received more tonnage in September than in August, but for the majority the sales trend in the past month was downward. October should bring an improvement over September both in automotive buying and in general replenishment, but the extent of the latter is dependent upon the rapidity with which miscellaneous users of steels liquidate their present stocks, which, in many instances, are sufficient to last from 30 to 90 days at present rates of consumption.

One obstacle to the resumption of buying by the railroads has been removed by the settlement of the wage controversy, and, although industry generally is opposed to further pyramiding of costs, there is a recognition of the justice of the carriers' plea for higher freight rates to compensate for wage rises. No word is obtainable from the Interstate Commerce Commission as to when a decision may be announced, and there is doubt in the steel trade that it will come in time to produce much buying of steel by the railroads over the remainder of the year. If orders should come late in the quarter, they will benefit early 1938 schedules rather than this quarter's operations.

PIG iron production has declined along with steel ingot output. At the end of September the United States Steel Corp. blew out nine blast furnaces, the independents took off two and one went on, leaving a net loss of 10 in a month. The number in blast on Oct. 1 was 181 compared with 191 on Sept. 1. These 181 furnaces were making iron at the rate of 110,260 tons a day, whereas the 191 in blast on Sept. 1 were producing at a rate of 115,420 tons a day. Total output in September was 3,410,371 gross tons, against 3,605,818 tons in August, or a September daily rate of 113,679 tons, compared with 116,317 tons in August. Whereas the August rate was 3 per cent above that of July, the September daily average declined 2.3 per cent.

Curtailment in Lake Superior ore shipments is also a reflection of an altered outlook for steel production over the next few months. While the water movement up to Oct. 1 of 54,612,122 gross tons was greater by 1,347,295 tons than in the corresponding period of the record-breaking year 1929, shipments have settled down to a slower pace. Shipments in October are expected to show quite a drop from the 9,173,991 tons in September. The United States Steel Corp. will take some boats out of commission at the end of their present trips.

With an almost complete cessation of steel mill buying of scrap, prices have declined except at Pittsburgh, where sharp drops had previously occurred, bringing THE IRON AGE scrap composite price down to $16.91, its low point of the year thus far and 17c. below the previous low of $17.08 in June.

WHILE railroad buying of steel is negligible, an inquiry for 37 passenger cars has been issued by the Santa Fe, and the Burlington has placed 13 light-weight passenger cars that will require about 200 tons of stainless steel with a Philadelphia builder.

Building construction is a small factor in the market, lettings of only 7900 tons in the week being mostly for public projects. New jobs call for about 18,000 tons, which are likewise predominantly in the same category.

Iron and steel exports in August totaled 408,023 tons, a loss of 11.6 per cent in volume from July, but the total for the eight months is 2,239,521 tons. This is exclusive of scrap, which totaled 478,296 tons in August and 3,079,003 tons in eight months.

# . . . PITTSBURGH . . .

***. . . Backlogs further reduced and operations are again curtailed.***

o o o

***. . . Moderate gain in new orders might lift production.***

o o o

***. . . Pittsburgh district at 61%, Wheeling area at 75%.***

PITTSBURGH, Oct. 5.—The rate of incoming business during the past two weeks has slowed up somewhat compared with the previous two periods. As a result, backlogs have been further reduced and steel ingot operations rather sharply curtailed. Ingot output in the Pittsburgh district this week has declined eight points to 61 per cent of capacity, a low point for the year. Wheeling district operations this week are down 10 points to 75 per cent of capacity.

With steel ingot output closely approximating the volume of incoming business, a moderate gain in new orders would be sufficient to raise the rate. Should a further decline in steel mill activity occur, it is not expected that the drop will be drastic.

Specifications during the past week showed no improvement over the previous period with the possible exception of wire and sheet bookings. Makers are still looking forward to a better volume of automotive tonnage. For most steel companies, September business was below August volume. It is interesting to note, however, that structural plate and shape specifications during September were about on a par with August orders.

With the wage question now out of the way, there is a good possibility that railroads may be granted rate increases. Should this occur, and many quarters anticipate it, it is expected that railroad equipment orders will reach steel mills by the end of 1937. However, such purchases will probably have no effect on steel mill operations until early in 1938. Meanwhile, railroad buying between now and the end of the year is expected to consist mostly of miscellaneous rebuilding tonnages.

Raw material markets continue dull and uneventful.

### *Pig Iron*

New business continues in small lots with most activity involving commitments already made. The recent lull has enabled most producers to replace depleted inventories substantially. In line with the reduction in steel ingot operations, four steel-making stacks were taken out of operation during September. A merchant furnace in the Valleys has been blown out during the past few days. Demand from heating equipment manufacturers and jobbing foundries is light but sanitary interests continue to maintain recent high operations.

### *Semi-Finished Steel*

Total demand during September was below bookings placed in August. New business during the past week has declined somewhat from the previous period. Part of this decline is undoubtedly due to less active demand from non-integrated makers whose business has also been affected.

### *Bolts, Nuts and Rivets*

The volume of new business continues spotty and irregular with most plants operating between 50 and 60 per cent of capacity. September orders were slightly ahead of August bookings.

### *Bars*

In most cases total hot-rolled bar tonnages during September were less than August bookings. Specifications in the past week were no better than in the previous two periods, in some cases having actually declined. Order books are being affected somewhat by the reluctance of non-integrated makers to place specifications. Most of the latter appear to have ample stocks and are inclined to work these down somewhat before making larger commitments. Obviously the retardation in new automobile production is having its effect on production schedules at bar mills.

### *Cold Finished Bars*

New business is no better than a week ago and tonnages received are small in both number and size. Automobile buying is lagging and the same may be said for miscellaneous purchases.

### *Reinforcing Bars*

Inquiries and awards continue fairly numerous, although most projects call for less than 500 tons. Largest inquiry of the week involves 775 tons for a bridge at Northampton, Mass.

### *Plates and Shapes*

Structural plate and shape specifications during September were practically on a par with August bookings. Mill operations continue to get a substantial amount of support from heavy structural business. Plate bookings have made a much better showing in recent weeks than structural shapes. An outstanding inquiry of the week involves 860 tons for a brewing company stockhouse at Pittsburgh. American Bridge Co., Pittsburgh, was recently awarded the contract for sewage plant buildings, Detroit, involving 920 tons of material.

### *Steel Sheet Piling*

New business continues dull, although there are a few jobs requiring less than 100 tons in the offing. Carnegie-Illinois Steel Corp. will furnish 580 tons for TVA's Chickamauga dam.

### *Tin Plate*

Tin plate operations this week may be estimated at 92 to 96 per cent. A few companies are still operating at or above 100 per cent while others have reduced running time. Domestic packers' business is practically over but there remains some export tonnage for early shipment.

### *Sheets*

Sheet sales during the past week increased slightly over the previous period but are still below the activity of a few weeks ago. The slight improvement last week was not confined to automotive buying. Miscellaneous demand emanating

# A Comparison of Prices

## Market Prices at Date, and One Week, One Month, and One Year Previous
## Advances Over Past Week in Heavy Type, Declines in Italics

### Rails and Semi-finished Steel

| *Per Gross Ton:* | Oct. 5, 1937 | Sept. 28, 1937 | Sept. 8, 1937 | Oct. 6, 1936 |
|---|---|---|---|---|
| Rails, heavy, at mill | $42.50 | $42.50 | $42.50 | $36.37½ |
| Light rails, Pittsburgh | 43.00 | 43.00 | 43.00 | 35.00 |
| Rerolling billets, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Sheet bars, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Slabs, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Forgings billets, Pittsburgh | 43.00 | 43.00 | 43.00 | 39.00 |
| Wire rods, Nos. 4 and 5, P'gh | 47.00 | 47.00 | 47.00 | 40.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb. | 2.10 | 2.10 | 2.10 | 1.80 |

### Finished Steel

| *Per Lb.:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Bars, Pittsburgh | 2.45 | 2.45 | 2.45 | 2.05 |
| Bars, Chicago | 2.50 | 2.50 | 2.50 | 2.10 |
| Bars, Cleveland | 2.50 | 2.50 | 2.50 | 2.10 |
| Bars, New York | 2.78 | 2.78 | 2.78 | 2.40 |
| Plates, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 |
| Plates, Chicago | 2.30 | 2.30 | 2.30 | 1.95 |
| Plates, New York | 2.53 | 2.53 | 2.53 | 2.19 |
| Structural shapes, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 |
| Structural shapes, Chicago | 2.30 | 2.30 | 2.30 | 1.95 |
| Structural shapes, New York | 2.5025 | 2.5025 | 2.5025 | 2.16¼ |
| Cold-finished bars, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.35 |
| Hot-rolled strips, Pittsburgh | 2.40 | 2.40 | 2.40 | 1.95 |
| Cold-rolled strips, Pittsburgh | 3.20 | 3.20 | 3.20 | 2.60 |
| Hot-rolled annealed sheets, No. 24, Pittsburgh | 3.15 | 3.15 | 3.15 | 2.60 |
| Hot-rolled annealed sheets, No. 24, Gary | 3.25 | 3.25 | 3.25 | 2.70 |
| Sheets, galv., No. 24, P'gh | 3.80 | 3.80 | 3.80 | 3.20 |
| Sheets, galv., No. 24, Gary | 3.90 | 3.90 | 3.90 | 3.30 |
| Hot-rolled sheets, No. 10, Pittsburgh | 2.40 | 2.40 | 2.40 | 1.95 |
| Hot-rolled sheets, No. 10, Gary | 2.50 | 2.50 | 2.50 | 2.05 |
| Cold-rolled sheets, No. 20, Pittsburgh | 3.55 | 3.55 | 3.55 | 3.05 |
| Cold-rolled sheets, No. 20, Gary | 3.65 | 3.65 | 3.65 | 3.15 |
| Wire nails, Pittsburgh | 2.75 | 2.75 | 2.75 | 2.05 |
| Wire nails, Chicago dist. mill | 2.80 | 2.80 | 2.80 | 2.10 |
| Plain wire, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.50 |
| Plain wire, Chicago dist. mill | 2.95 | 2.95 | 2.95 | 2.55 |
| Barbed wire, galv., P'gh | 3.40 | 3.40 | 3.40 | 2.55 |
| Barbed wire, galv., Chicago dist. mill | 3.45 | 3.45 | 3.45 | 2.60 |
| Tin plate, 100-lb. box, P'gh | $5.35 | $5.35 | $5.35 | $5.25 |

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

### Pig Iron

| *Per Gross Ton:* | Oct. 5, 1937 | Sept. 28, 1937 | Sept. 8, 1937 | Oct. 6, 1936 |
|---|---|---|---|---|
| No. 2 fdy., Philadelphia | $25.76 | $25.76 | $25.76 | $21.3132 |
| No. 2, Valley furnace | 24.00 | 24.00 | 24.00 | 19.50 |
| No. 2, Southern Cin'ti | 23.69 | 23.69 | 23.69 | 19.44 |
| No. 2, Birmingham† | 20.38 | 20.38 | 20.38 | 15.88 |
| No. 2, foundry, Chicago* | 24.00 | 24.00 | 24.00 | 19.50 |
| Basic, del'd eastern Pa. | 25.26 | 25.26 | 25.26 | 20.8132 |
| Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 19.00 |
| Malleable, Chicago* | 24.00 | 24.00 | 24.00 | 19.50 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 19.50 |
| L. S. charcoal, Chicago | 30.04 | 30.04 | 30.04 | 25.7528 |
| Ferromanganese, seab'd, carlots | 102.50 | 102.50 | 102.50 | 75.00 |

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

### Scrap

| *Per Gross Ton:* | | | | |
|---|---|---|---|---|
| Heavy melting steel, P'gh | $17.75 | $17.75 | $21.25 | $18.25 |
| Heavy melting steel, Phila. | *17.25* | 18.25 | 19.75 | 15.75 |
| Heavy melting steel, Ch'go | *15.75* | 16.75 | 18.25 | 16.25 |
| Carwheels, Chicago | *17.25* | 18.00 | 19.25 | 16.50 |
| Carwheels, Philadelphia | 20.25 | 20.25 | 20.75 | 16.75 |
| No. 1 cast, Pittsburgh | *18.75* | 19.25 | 20.25 | 16.25 |
| No. 1 cast, Philadelphia | 20.25 | 20.25 | 20.75 | 16.75 |
| No. 1 cast, Ch'go (net ton) | 13.50 | 13.50 | 15.25 | 14.00 |
| No. 1 RR. wrot., Phila. | 20.25 | 20.25 | 20.75 | 15.75 |
| No. 1 RR. wrot., Ch'go (net) | *13.75* | 14.50 | 15.75 | 14.25 |

### Coke, Connellsville

| *Per Net Ton at Oven:* | | | | |
|---|---|---|---|---|
| Furnace coke, prompt | $4.25 | $4.25 | $4.35 | $3.75 |
| Foundry coke, prompt | 5.00 | 5.00 | 5.00 | 4.25 |

### Metals

| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Electrolytic copper, Conn. | *12.75* | 13.00 | 14.00 | 9.75 |
| Lake copper, New York | *13.125* | 13.125 | 14.12½ | 9.87½ |
| Tin (Straits), New York | *55.75* | 57.875 | 58.75 | 45.37½ |
| Zinc, East St. Louis | *6.50* | 7.25 | 7.25 | 4.85 |
| Zinc, New York | *6.85* | 7.60 | 7.60 | 5.22½ |
| Lead, St. Louis | 5.85 | 5.85 | 6.35 | 4.45 |
| Lead, New York | 6.00 | 6.00 | 6.50 | 4.60 |
| Antimony (Asiatic), N. Y. | 18.25 | 18.25 | 17.50 | 12.50 |

# The Iron Age Composite Prices

| | Finished Steel | Pig Iron | Steel Scrap |
|---|---|---|---|
| Oct. 5, 1937 | 2.605c. a Lb. | $23.25 a Gross Ton | $16.91 a Gross Ton |
| One week ago | 2.605c. | 23.25 | 17.58 |
| One month ago | 2.605c. | 23.25 | 19.75 |
| One year ago | 2.197c. | 18.73 | 16.75 |

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

| | Finished Steel High | Finished Steel Low | Pig Iron High | Pig Iron Low | Steel Scrap High | Steel Scrap Low |
|---|---|---|---|---|---|---|
| 1937 | 2.605c., Mar. 9 | 2.330c., Mar. 2 | $23.25, Mar. 9 | $20.25, Feb. 16 | $21.92, Mar. 30 | $16.91, Oct. 5 |
| 1936 | 2.330c., Dec. 28 | 2.084c., Mar. 10 | 19.73, Nov. 24 | 18.73, Aug. 11 | 17.75, Dec. 21 | 12.67, June 9 |
| 1935 | 2.130c., Oct. 1 | 2.124c., Jan. 8 | 18.84, Nov. 5 | 17.83, May 14 | 13.42, Dec. 10 | 10.33, April 23 |
| 1934 | 2.199c., Apr. 24 | 2.008c., Jan. 2 | 17.90, May 1 | 16.90, Jan. 27 | 13.00, Mar. 13 | 9.50, Sept. 25 |
| 1933 | 2.015c., Oct. 3 | 1.867c., Apr. 18 | 16.90, Dec. 5 | 13.56, Jan. 3 | 12.25, Aug. 8 | 6.75, Jan. 3 |
| 1932 | 1.977c., Oct. 4 | 1.926c., Feb. 2 | 14.81, Jan. 5 | 13.56, Dec. 6 | 8.50, Jan. 12 | 6.43, July 5 |
| 1931 | 2.037c., Jan. 13 | 1.945c., Dec. 29 | 15.90, Jan. 6 | 14.79, Dec. 15 | 11.33, Jan. 6 | 8.50, Dec. 29 |
| 1930 | 2.273c., Jan. 7 | 2.018c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.317c., Apr. 2 | 2.273c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |
| 1928 | 2.286c., Dec. 11 | 2.217c., July 17 | 18.59, Nov. 27 | 17.04, July 24 | 16.50, Dec. 31 | 13.08, July 2 |
| 1927 | 2.402c., Jan. 4 | 2.212c., Nov. 1 | 19.71, Jan. 4 | 17.54, Nov. 1 | 15.25, Jan. 11 | 13.08, Nov. 22 |

from jobbers, electrical equipment interests and farm implement manufacturers accounted for most of the increase. Current orders are somewhat below shipments with the result that fairly prompt delivery on all grades of sheets is the general rule.

### *Wire Products*

Total wire business in September showed a healthy improvement over August booking with the increases occurring in wire rod and manufacturers' wire bookings. During the past few weeks jobber buying has shown a moderate increase but producers look for a continuation of hand-to-mouth buying practices. Refrigerator shelf makers have been in the wire market during the past week.

### *Strip*

Hot and cold rolled strip bookings during the past week have shown no improvement. The lull in new business has extended to all classifications. While producers expect better automotive buying soon, many mills feel that stocks at parts-makers' plants are sufficient to keep orders from this source at a minimum for several weeks.

### *Tubular Goods*

Total September business compared favorably with August tonnages but the trend during the past few weeks has been downward. The volume of oil-country goods specifications during the past week has been fair but represents miscellaneous tonnages involving small lots. Backlogs are being rapidly worked off but producers are now replenishing their warehouse and mill stocks. As it will take at least one or two months to complete the building up of inventories, some makers expect a substantial pick-up in incoming business by that time.

### *Coal and Coke*

Coal production has received a slight impetus from the usual last-minute rush to get tonnages to Lake regions before the shipping season closes. Industrial coal demand continues dull despite the threat of higher prices when Coal Commission quotations are established. Railroads have curtailed purchases and there is evidence of an attempt to keep stocks down. Beehive furnace coke demand is exceptionally dull but foundry coke is still fairly active.

## . . . CINCINNATI . . .

### *. . . Demand for sheets and pig iron more active.*

CINCINNATI, Oct. 4.—The district sheet steel market became more active the past week under renewed buying interest from automotive sources. Demand averaged about 70 per cent of capacity, being a sharp increase of about 20 per cent over the preceding week's average. While the largest improvement was recorded in automobile requirements, more zest was noted in purchasing for miscellaneous uses. Production, however, has shown little relative change since mills have been reducing backlogs steadily. Unless general demand broadens, mill operations are expected to be curtailed.

The pig iron market experienced a moderate upturn in demand. Specifications against contracts increased about 30 per cent. Automobile and machine tool foundries tend to be more active.

Warehouse business also is moving upward. Individual volume, however, is not as heavy as previously, but the slack is offset by increased quantity of orders.

## . . . . BUFFALO . . . .

### *. . . Strip mill sets new output record but ingot production sags.*

BUFFALO, Oct. 5.—Another cut in open hearth operation was made early this week when Bethlehem's Lackawanna plant dropped two furnaces—from 25 to 23. Throughout the week-end 24 were active, this figure being reduced Tuesday. Republic operation was continued at five and Wickwire-Spencer, two.

While steel business backlogs have diminished, and the new automobile commitments have not been made in quantity, Bethlehem's Lackawanna strip mill was able to establish during September a new high production of 103,000 tons gross, against 91,000 in August—the previous high.

New construction is still under wraps, few sizable projects developing. An exception is the New York Central railroad grade crossing job at Belle Isle, N. Y., near Syracuse, involving 500 tons of fabricated structural steel. Bids are being taken today.

Remodeling of the Cataract Theater, Niagara Falls, N. Y., will require 160 tons of structural, and voters of six school districts in Allegany County, N. Y., have endorsed a centralized school project in the town of Scio. Unofficial estimates are that 150 tons of structural steel will be used. This is one of a dozen or more centralized school buildings due to come out this fall.

September warehouse business was even with August and July, above September, 1936.

## . . . . ST. LOUIS . . . .

### *. . . Steel buying light, operations are lower.*

ST. LOUIS, Oct. 5.—Marking time is the usual way of describing the situation in the steel market. There has been only a small amount of buying of any item, with structural shapes especially quiet. Railroad buying is light, the only new business being the authorization given the Wabash Railway to install 100 Evans loading devices to cost $32,310. Structural fabricating plants are working, it is estimated, at an average of 60 per cent of capacity, with several plants at slightly better than 75 per cent. The general contract has been awarded to Foster & Creighton Co., Nashville, Tenn., for the Marine Hospital, requiring 140 tons of structural shapes and 325 tons of reinforcing bars.

Shipments of pig iron during September were slightly better than in August, but there has been little business for several weeks except spot cars. The melt is off, open hearth ingot operations being down to 60 per cent of capacity, and the stove plants have halted their manufacturing until they can move more of the stock they have in warehouses. While buying of agricultural implements has shown a decline, the operations in the industry continue at a heavy rate in anticipation of liberal buying from farmers.

# . . . . CHICAGO . . . .

***. . . Ingot output drops to 64½% as backlogs disappear.***

o o o

***. . . New ordering in small lots and for immediate needs only.***

o o o

***. . . Pig iron shipments gain; steel scrap off $1.***

CHICAGO, Oct. 5.—With one mill alone reporting a 14 per cent drop in operations from last week, and three other district operators registering smaller losses, ingot output has slumped 11½ points to 64½ per cent of capacity. A spokesman for the mill showing the greatest decline gave as reasons for the reduction in operations the slowness of the automobile industry in specifying for new models and the fact that railroad buying for work now underway is about finished and that little prospect is seen in the immediate future for new buying. Other lines, he said, are enjoying good business.

Paradoxically, this same mill showed the best sales last week for nine weeks and the second best sales for 16 weeks. Specifications were the best in six weeks and were well above the average for that period. No explanation or analysis of this increased business was offered, but it is assumed that additional releases of automobile tonnage, more response from miscellaneous consumers, and the closing of a few large jobs all in that one week by coincidence were responsible for this improved showing. Another mill reported September business one-third under August, while other producers stated that September showed little change.

Shipments from district mills are generally in excess of orders. Operating declines in some cases were caused by the elimination of backlogs and the necessity of running on day-to-day orders. Delivery in nearly all lines is practically prompt, a delay of more than two to three weeks being extremely rare, except in the case of tin plate, which is sold well into the final quarter.

In all probability the 44c. a day wage increase granted to the railroad brotherhoods will not carry with it immediately a comparable freight rate advance for the carriers and a consequent stimulation of railroad purchasing, as many have been hoping all during the mediation efforts. Delays in considering the railroads' petition for an increase are expected to place a check on any considerable buying over the remainder of this year.

All sellers report that most of their customers are buying for immediate requirements only, as opposed to their former custom of ordering two and three months or even further ahead. Inventories are being reduced in all lines, but when the present uncertainty is ended, inventories will have to be restored, so that much business is certain in time. Iowa jobbers are buying in increasing volume now in anticipation of good business when the farmers' corn money is received later in the fall. In Milwaukee, warehouse activity is light, labor is giving no trouble, and industry is buying only as far ahead as it can see. In the Twin Cities, manufacturing is in fair shape, while general business and jobber trade is good. A St. Paul maker of humidifying units has orders on hand which will require a considerable tonnage of sheets. Green Bay, Wis., building permits are 60 per cent under normal, the drop being attributed almost entirely to the high cost of labor.

Labor difficulties have been reported in occasional instances in Wisconsin and Minnesota. One explanation heard for the delay in the release of automotive tonnages is that the industry wishes to proceed with caution as long as labor's actions are so uncertain. It has been heard from several sources that industry as a whole is trying to avoid another boom because of the almost inevitable high-handedness of labor during such periods.

The high rate of activity among farm equipment manufacturers continues unchecked. One harrow maker, however, canceled some steel orders because of a cancellation of orders for his equipment from the cotton fields where adverse prices made the purchase of equipment impossible.

Steel scrap, because of lack of mill interest, is being quoted from $15.50 to $16, off $1 a ton from last week.

### *Pig Iron*

Shipments for September were slightly higher than in August, both in pig iron and foundry coke, thus indicating a small increase in the district's rate of melt. Buyers, generally, however, are reducing inventories because of present uncertain conditions, and contract buying is being replaced at the moment by purchases for current needs only. Sellers are optimistic, however, and see no threats of a drastic curtailment in foundry operations. Pig iron production in this district during September totaled 696,789 tons compared with 718,815 in August. On Sept. 24 one furnace at Carnegie-Illinois South works was blown out and on Oct. 4 a stack at Gary and another at South were taken from blast.

### *Reinforcing Bars*

A number of awards and inquiries have been reported this week, but the market still cannot be termed particularly active. Price cutting has been reported in a few instances near Chicago, but quotations are generally firm.

### *Warehouse Business*

In spite of lessening activity in steel business, leading warehouse sellers report that September finished up in exactly the same relation to August as was the case last year and the year before. Farmers are reported as being optimistic over their income prospects and do not appear to be worried over weakness in the stock market. Demand for heavier sections has eased somewhat from spring and summer, while good business is reported in alloy steels, sheets, bars and small shapes. Demand is well diversified, and jobbers are anticipating a prosperous October. They have good stocks.

### *Wire and Wire Products*

September and August sales and shipments of wire and wire products in this area were about on a par. But October is expected to show an increase. Miscellaneous demand is good, automobile consumption has not yet reached the high levels expected of it, and buying from rural areas of fencing

and other types of wire for farm use is still insignificant in volume, although specifications are holding up well from the makers of farm equipment. Stocks, at the present rate of consumption among customers, are sufficient to last from 30 to 60 days.

### *Plates and Shapes*

Business in heavy steel lines continues dull, and at the moment there is not a single bright spot on the horizon. It is unlikely that the railroads' petition for a freight rate rise will be acted upon immediately, thus sounding a death knell to hopes for sizable car and rail orders during the fourth quarter if a delay is experienced. Deliveries are practically prompt, and most plate mils are operating on a hand-to-mouth basis. The American Bridge Co. was awarded 900 tons of shapes for a Detroit sewage treatment plant, and Mississippi Valley Structural Steel Co. was given 1000 tons for a Borg-Warner subsidiary plant in Rockford, Ill. No inquiries over 100 tons have been reported this week, and fabricators state that nothing of importance is in sight.

### *Sheets*

With orders from the automotive industry still lagging, district sheet mills are finding themselves none too well occupied. About three weeks' work is on hand in hot rolled annealed and galvanized sheets, but some hot rolled and cold rolled mills are operating practically on a day-to-day basis. Some demand has been reported from makers of refrigerator cabinets, air conditioning units, etc. But salesmen find that inventories are being reduced generally, and that companies which formerly bought several months ahead now purchase only for their immediate requirements. An opinion has been expressed that some of the delay in the placing of sheet orders for motor cars may be because of that industry's desire to proceed with caution until labor is fully under control.

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## REINFORCING STEEL

***. . . Awards of 4400 tons —5830 tons in new projects.***

**AWARDS**

**Boston,** 250 tons, Northeastern University engineering building, to Concrete Steel Co.

**Trumbull, Conn.,** 250 tons of mesh, to American Steel & Wire Co.

**Smithfield, R. I.,** 150 tons, State institution, to an unnamed bidder.

**New York,** 130 tons, bridge and highway project, East 134th-135th Streets, to Joseph T. Ryerson & Son, Inc., New York.

**Scotch Plains, N. J.,** 270 tons, highway project, to Stulz-Sickles Co., Newark, N. J.

**Philadelphia,** 925 tons, court house, to Sweet's Steel Co., Williamsport, Pa.

**Pittsburgh,** 120 tons, warehouse, Kirby Transfer Co., to Lind Co., Pittsburgh.

**Wilmington, Del.,** 100 tons, Polytechnic High School, to Bethlehem Steel Co.

**Washington,** 375 tons, Gustave Ring Colonial Village apartment building, to Rosslyn Steel & Cement Co., Rosslyn, Va.

**Williamstown, Ky.,** 150 tons, overhead bridge, Southern Railroad, to Pollak Steel Co., Cincinnati.

**Detroit,** 100 tons, Baby Creek sewer, breakwater gates and sewage regulation chambers, to Joseph T. Ryerson & Son, Inc., Chicago.

**Chicago,** 100 tons, sanitary district, S. W. works, division H-H, to Joseph T. Ryerson & Son, Inc.

**Chicago,** 350 tons, Visking Corp. building, to Joseph T. Ryerson & Son, Inc.

**Chicago,** 150 tons, Brinks Express Co. building, to Inland Steel Co.

**Stickney, Ill.,** 130 tons, sewer, to Joseph T. Ryerson & Son, Inc.

**Moline, Ill.,** 168 tons, State highway bridge, to Joseph T. Ryerson & Son, Inc.

**Park Ridge, Ill.,** 125 tons, water reservoir, to Ceco Steel Products, Omaha, Neb.

**Minneapolis,** 225 tons, University of Minnesota social science building, to Hustad Co., Minneapolis.

**San Francisco,** 162 tons, Traung Printing plant, to W. S. Wetenhall Co., San Francisco.

**Marin County, Cal.,** 144 tons, two State bridges, to Bethlehem Steel Co.

**NEW REINFORCING BAR PROJECTS**

**New York,** 1600 tons, grade crossing elimination, Cypress Avenue, Southern Boulevard and Major William F. Deegan Boulevard in Bronx; bids until Oct. 13 by Borough president.

**Northampton-Hadley, Mass.,** 775 tons, bridge.

**Queens, N. Y.,** 450 tons, sewers.

**Belle Isle, N. Y. (near Syracuse),** 100 tons, New York Central grade crossing; bids taken Oct. 5.

**Weehawken, N. J.,** 1125 tons (viaduct), New Jersey approach, Lincoln Tunnel; bids until Oct. 26 by Port of New York Authority on contract MHT-24. Contract also calls for 60,000 lin. ft. of reinforced trusses.

**Selinsgrove, Pa.,** 400 tons, hospital.

**Bethlehem, Pa.,** 100 tons, Lehigh University dormitory.

**Lafayette, Ind.,** horticultural building and agricultural chemistry building, Purdue University; bids Oct. 19.

**Lake County, Ind.,** unstated tonnage, tuberculosis sanitarium; bids Oct. 8.

**Rock Island, Ill.,** unstated tonnage, Peoples Power Co., office and service building; bids Oct. 12.

**Rock Island, Ill.,** unstated tonnage, Quad City Coca-Cola building; bids Oct. 12.

**Chicago,** 410 tons, Moody Institute building.

**Chicago,** 350 tons, Regenstiner Corp. building.

**Chicago,** 260 tons, Verdi High School.

**St. Louis,** 325 tons, Marine Hospital; Foster & Creighton Co., Nashville, Tenn., general contractor.

**Galt, Cal.,** 115 tons, two State bridges; bids Oct. 20.

**Los Angeles,** 142 tons, State bridge; bids Oct. 21.

## . . . . PIPE LINES . . . .

**Keystone Pipe Line Co.,** 260 South Broad Street, Philadelphia, a subsidiary of Atlantic Refining Co., same address, plans new welded steel pipe line from bulk terminal to be erected at Tonawanda, N. Y., to Utica, N. Y., over 200 miles, for gasoline transmission to latter point, where another bulk terminal will be located. Work will be carried out under direction of Buffalo Pipe Lines, Inc., Buffalo, an affiliated interest. Pumping stations will be located along route for booster service. Entire project will cost over $1,000,000. First noted company is building new 8-in. welded steel pipe line from Williamsport, Pa., to terminus at Tonawanda, about 213 miles, for gasoline transmission and has purchased an 18-acre tract for terminal plant, to cost about $150,000 with steel tanks and other equipment. From terminal plant company will build another welded steel pipe line to Niagara River for gasoline transmission for loading barges on Lake Erie. Jones & Hanrahan, Dallas, Tex., are contractors for construction of Williamsport-Tonawanda pipe line.

**Bureau of Supplies and Accounts,** Navy Department, Washington closes bids Oct. 12 for 23,500 ft. of galvanized steel pipe for Eastern and Western Navy yards (Schedule 1754).

**Godfrey L. Cabot, Inc.,** Union Building, Charleston, W. Va., operating natural gas and carbon black properties, has let contract to Ligon & Ligon, 3310 Ridgewood Avenue, Baltimore, for new 12-in. welded steel pipe line from point near Sissonville, Kanawha County, W. Va., to Grantsville, Calhoun County, W. Va., about 45 miles, for natural gas transmission. Award for electric welding work on line has been made to H. C. Price Co., Bartlesville, Okla.

**Continental Oil Co., Ponca City, Okla.,** plans new 6-in. welded steel pipe line in part of Gaines County, about 14 miles, for crude oil transmission, connecting with present pipe line system in that vicinity. Cost close to $100,000.

**Lowell Water District,** Lowell, Wash., plans about five miles of 2 to 6-in. steel pipe for water system; also new 60,000-gal. elevated steel tank and tower and other waterworks installation. Cost about $87,000. Financing has been arranged through Federal grant and bond issue. Parker & Hill, Smith Tower Building, Seattle, are engineers.

**Caddo Pipe Line Co.,** First National Bank Building, Shreveport, La., a subsidiary of Grogan Oil Co., same address, has let contract to D. T. Ross Construction Co., Tyler, Tex., for 6-in. welded steel pipe line from Lisbon to Homer, La., about 10 miles, for crude oil transmission.

**General Purchasing Officer,** Panama Canal, Washington, asks bids until Oct. 15 for 52,000 ft. of galvanized welded steel pipe and 10,000 ft. of welded steel pipe (Schedule 3291).

**Northern Utilities, Inc.,** Casper, Wyo., plans extensions in welded steel pipe lines in territory outside of city limits for natural gas distribution; also for extensions in distributing lines and additional control and operating equipment. Cost close to $400,000.

# . . . CLEVELAND . . .

***. . . General Motors and Chrysler place large orders for sheets.***

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***. . . Business generally is so light, however, that operations drop.***

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***. . . Demand for building steel has declined sharply; railroad buying negligible.***

CLEVELAND, Oct. 5.—Large purchases of sheets were made by General Motors units and the Chrysler Corp. during the past week and more business is pending from the motor car industry. While these new orders were somewhat smaller in size than are usually placed when automobile plants are in full production, the tonnages were large enough to indicate that the purchasers are now about ready to make a real start in the manufacture of 1938 models. Some new bar tonnage also was placed by automobile plants. The sheet orders were distributed among several mills and call for deliveries over a 30-day period, rush shipments being specified for some of the tonnage. This automotive business has served to brighten what otherwise would be a rather gloomy picture in the steel industry and gives sheet mills some backlog of which they are badly in need.

With the upturn in automotive orders there is a feeling that the low point in the demand for finished steel has been passed and that the volume of business will show a fair gain over September. Another bright spot is the placing of considerable tonnage of sheets by a leading refrigerator manufacturer for new models. Some makers in this field are keeping up good production and others have built up large stocks and have curtailed operations.

Ingot output in the Cleveland-Lorain district dropped three points to 65 per cent of capacity. In the Younstown district there was a 10 point decline to 60 per cent of capacity due to a sharp curtailment by two steel plants.

The past week was one of the quietest in months in the volume of steel taken by consumers in the Cleveland territory. While some of the mills report an increase in the number of miscellaneous orders, they were all for small lots for early needs, there being no forward buying. Many metalworking plants still have considerable steel in stock, this being particularly true of sheets, and some plants have reduced operations. Forge shops and stamping plants in this territory are still awaiting the release of automotive specifications. Demand for steel in the building field has declined sharply. Railroad orders continue almost negligible. Scrap prices have again declined.

### *Bars, Plates and Shapes*

Demand for hot rolled bars continues light, although some producers report a slight gain in small lot orders from forge shops and cold finishing plants. Business from agricultural implement manufacturers is holding up well. Mills have a fair backlog in alloy bars. Activity in the construction field is limited to small lots and the outlook is not promising. Small fabricators are still fairly busy, but some of the larger shops need orders. Mill backlogs of structural shapes have been about wiped out and deliveries are promised in two weeks or sooner. Plates are quiet. The local wide plate mill is shut down this week.

### *Pig Iron*

With increased demand from automobile foundries, October shipments are expected to show a moderate gain over those of September. Domestic shipments by some furnaces gained in September over August, but some export business made the August total larger. Demand continues good from tractor and implement manufacturers, but is slow from makers of stoves and heating equipment. Small-lot sales are being made, but mostly for early needs, consumers seeing no incentive to buy for future requirements. With production in excess of the current demand, some of the furnaces are building up stock piles which have been quite low. Some jobbing foundries have cut down to a four-day week.

### *Sheets*

New orders for substantial lots were placed by some of the motor car manufacturers during the past week. Some of these orders were larger than have been received from automobile builders for several months and indicate that they are soon to get under production on new models. Part of the tonnage was purchased for rush shipment and some for delivery extending into November. Demand in this territory is very light. Many miscellaneous consumers still have good stocks and there has been some slowing down in operations by consuming plants. Strip business is light and some of the mills are badly in need of tonnage.

### *Wire Products*

New demand for manufacturers wire from the automotive industry continues light, but miscellaneous business is holding up fairly well. Orders for wire rope and electrical wire are about normal. Wire rods also are moving fairly well. Demand from the merchant trade shows no improvement. Jobbers are buying from hand to mouth, as stocks become depleted, but are doing little if any forward buying. Backlogs have been about wiped out.

### *Iron Ore*

Water shipments during September amounted to 9,173,991 tons. This was a decrease of 1,637,390 tons from August, but an increase of 1,692,920 tons or 22.63 per cent as compared with September last year. Lake shipments until Oct. 1 were 54,612,122 tons. This was a gain of 20,849,534 tons or 61.75 per cent over the same period last year. The movement until Oct. 1 was 1,347,295 tons greater than during the corresponding period in the record breaking season of 1929. However, the movement has settled down to a slower pace than in the latter part of 1929, September shipments in that year having been 9,547,040 tons. Shipments in October are expected to show quite a drop. The U. S. Steel Corp. will take its tow barges out of commission at the end of their present trips.

## ..SAN FRANCISCO..

### ...$12,000,000 to be spent in West by U. S. Army.

SAN FRANCISCO, Oct. 4.—Appropriations of more than $12,000,000 have been made for U. S. Army construction work in the 11 Western states, Hawaii and the Panama Canal Zone. Construction of new barracks will be the principal achievement of this appropriated fund.

The City Council, Bellingham, Wash., contemplates submitting a bond issue of from $1,000,000 to $1,500,000 to a vote of the people. This sum would be used in the construction of water system improvements.

Plans have been completed by the Petrol Corp., Los Angeles, for the construction of 23 miles of 8-in. steel pipe line in Santa Barbara County. Bid calls will be issued in the near future. Bids will be opened Oct. 20 on 9400 lin. ft. of 60-in. steel pipe to be used in the Sunset discharge main between Sunset Reservoir and 7th Avenue, San Francisco.

For the fourth consecutive week awards were at a minimum on the Pacific Coast.

## ..BIRMINGHAM..

### ...Backlogs dwindle as mills await upturn; blast furnace production holds.

BIRMINGHAM, Oct. 5.—Backlogs are steadily fading as fall demand continues to be disappointing. Most mills have just about caught up with old business with one exception—sheet mills.

Current market conditions are just beginning to be reflected in operations and probably will be more noticeable from now on unless there is an early upturn.

A substantial amount of structural steel tonnage on the books awaits specification and it is hoped that releases will begin in the next few weeks.

The fourth quarter has brought little change in the pig iron situation. Regular customers came back into the market in September for varying amounts and the market moved into the last quarter without incident. Shipments continue at about the same rate as last month.

Open hearth operations begin to show a slight recession. Last week 17 units were operated and this week 16 are scheduled. The blast furnace total is unchanged, with 17 active.

## ..GREAT BRITAIN..

### ...Tin plate prices easier; buyers hesitant; Continental markets quieter.

LONDON, Oct. 5. (*By Cable*).—New iron and steel business is quiet as most producers are fully occupied for several months and are reluctant to accept far forward contracts owing to the increasing costs of ore and fuel and a possible rise in blast furnace wages. No Cleveland foundry pig iron is yet available and only small parcels of hematite are obtainable before the end of the year. Rising Mediterranean freight rates caused a decrease in Tees imports during September and arrangements have been made for larger supplies from Scandinavian countries.

Continental imports of billets and sheet bars have improved, but are still behind quota and rerollers are insufficiently supplied. Heavy steel consumers are pressing for deliveries. Shipyards are specifying well, but new shipbuilding orders are slack as shipowners are apprehensive of costs.

Export steel is quieter. Tin plate prices have eased during the last weeks of fall in tin price and buyers are hesitant. Works are well sold for this year. Output is about 77 per cent, and unfilled orders are a trifle over 5,500,000 base boxes.

Black and galvanized sheets are quiet.

Continental iron and steel quietness is unallayed and the market is hesitant. An inquiry for plates has come from Manchukuo.

The Raw Steel Cartel left prices unchanged. The Tube Cartel made no important changes. Negotiations are proceeding for the formation of an International Cold Rolled Strip Cartel.

## ..CAST IRON PIPE..

**Boston** has closed bids on 1355 tons of 6 to 48-in. pipe; Warren Foundry & Pipe Corp. is low bidder.

**Kingston, Mass.**, has taken bids on about 100 tons of 6-in.

**Hampden, Me.**, will probably take bids this month on pipe for a waterworks system, for which PWA has allotted $58,950.

**Portland Water District**, Portland, Me., has awarded 6000 ft. of 6-in. and 17,000 ft. of 8-in. to Warren Foundry & Pipe Corp.

**Jeffersontown, Ky.**, plans pipe lines for water system; also other waterworks installation. Cost about $110,000. Bond issue has been authorized in that amount.

**Greenville, N. C.**, is arranging special election to approve bonds for $150,000 for pipe lines for extensions in water system and other waterworks installation; also for extensions and improvements in sewer system.

**LaFayette, Ala.**, has approved bond issue of $32,000 for pipe lines for water system and other waterworks installation.

**Benton, La.**, plans pipe lines for water system and other waterworks installation. Cost about $25,000. Bond issue will be arranged soon. R. L. Tatum, Levy Building, Shreveport, La., is consulting engineer.

**Corpus Christi, Tex.**, plans pipe lines for extensions in water system and other waterworks installation; also for extensions and improvements in gas distribution system. Cost about $750,000. A bond issue in that amount is being arranged. Myers, Noyes & Forrest, Tower Petroleum Building, Dallas, Tex., are consulting engineers.

**Rotan, Tex.**, plans pipe lines for extensions in water system; also pumping equipment and other waterworks installation. Cost over $30,000. Hawley, Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

**Sonora, Tex.**, plans pipe lines for water system and other waterworks installation. Recent call for bids has been postponed, and new call will be made soon. Cost close to $90,000. H. R. F. Helland, Frost Bank Building, San Antonio, Tex., is consulting engineer.

**Kenosha, Wis.**, has placed 3600 ft. of 6-in., class 150, water pipe with James B. Clow & Sons, Chicago.

**La Crosse, Wis.**, closed bids Oct. 6 on 2100 ft. of 6 and 8-in. water mains, including pipe material.

**Cuba City, Wis.**, has placed 5350 ft. of 6 and 8-in. water pipe with Baker Mfg. Co., Evansville, Wis.

**Preble (Brown County), Wis.**, will take bids soon for pipe for water system and other waterworks installation. Cost $185,400. Financing has been arranged through Federal aid. H. R. Albert, 101 North Washington Street, Green Bay, Wis., is engineer; A. E. McMahon Engineering Co., Menasha, Wis., is consulting engineer.

**Sacramento, Cal.**, will open bids Oct. 14 on 155 tons of 4, 6 and 8-in. pipe.

**Petrol Corp., Los Angeles**, has plans for construction of 23 miles of 8-in. pipe line in Santa Barbara County.

**Long Beach, Cal.**, plans 6466 ft. of 6,

## . . . . NEW YORK. . . .

***. . . Buying on a hand-to-mouth basis and in very small volume.***

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***. . . Stocks in hands of consumers and jobbers still quite large.***

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***. . . Railroad wage settlement removes one obstacle in resumption of buying.***

NEW YORK, Oct. 4.—Replenishment demand for steel has shown a minor gain in the past week, but the total volume of business is still so low that it is not safe to predict that an upward trend is in the making. One fact stands out prominently—stocks in the hands of many consumers and jobbers are large enough to last for many weeks at the current rate of consumption. Liquidation of these inventories is the main concern of steel users. Meanwhile, orders are of the hand-to-mouth variety — small in tonnage and wanted as quickly as possible, indicating that buyers have waited until the last possible moment to enter them.

Although sentiment has improved, there is still an evident feeling of caution among buyers, which may not be removed until events have more clearly shaped the future.

A topic of discussion is the wage agreement between the railroads and the five railroad brotherhoods. This agreement, it is generally believed, removes one obstacle to a renewal of railroad buying, but it is not expected that the carriers will come back into the market as important buyers until the matter of freight rates is also settled. If the Interstate Commerce Commission should grant higher rates that would compensate the railroads for increased labor costs, the way would be paved for a resumption of railroad buying. In all probability the purchase of rails and car repair material would come first, although some car building programs that have been held in abeyance might make their appearance within a reasonably short time. Much will depend, of course, on the volume of freight traffic over the remainder of the year and the outlook for next year.

Tin plate demand is less active, but the mills have sufficient tonnage on their books to operate on a 15-turn basis during the next few weeks. Companies whose tin mill departments were closed by strikes last June are completing their orders at the old price of $4.85 a base box, Pittsburgh, but others are at work on tonnage taken at $5.35. It is probable that the companies that are now shipping orders at the $4.85 price will complete their obligations by the end of October or early in November. The outlook for the tin plate branch of the industry after that is not clear. Some of the can companies have good stocks, but late in the year they usually give the mills orders for anticipatory rolling.

In the construction field the outstanding projects are a viaduct for the New Jersey approach to the Lincoln tunnel and a grade crossing elimination job in the Bronx. The former calls for 1835 tons of structural steel, 1125 tons of reinforcing bars and 60,000 lin. ft of reinforcing trusses and the latter requires 1600 tons of structural steel, 1600 tons of reinforcing bars and large quantities of pipe of various sizes.

### *Pig Iron*

The firming up of the non-ferrous markets and the growing conviction that the stock market has about reached the bottom of its downward swing has bolstered sentiment among the pig iron buyers, but this improvement has not as yet been reflected in new ordering, which continues light in volume and consists mostly of carloads for mixing purposes. Shipments, while somewhat lighter than they have been for sometime, are still in sufficient volume to prevent piling up stocks to any extent in furnace yards. In certain specialized fields melting activity is down slightly, but on the whole castings operations are holding up well. Export shipments against existing contracts continue to go forth in moderate tonnages, but in view of the scarcity of new business of any size, unshipped tonnages on these old contracts are fast dwindling. One dealer has reported receiving a new inquiry for 2000 tons for shipment to China.

### *Plates and Sheets*

Dullness continues to prevail in both sheets and plates. Warehouse demand is practically nil, and, in the absence of new orders, mills are building up their stocks of such standard items as galvanized sheets. Plate backlogs of eastern Pennsylvania mills have been lowered to the point where deliveries on universal plate can be made in a week and on wide plate in two weeks. Last spring, by way of comparison, deliveries on the latter item were running from 20 to 22 weeks from date of order. Immediate prospects are not encouraging, although larger releases on old orders from local shipyards brings the day of new buying from that source that much closer.

### *Wire*

The September volume of sales of manufacturers' wire was fair, but jobbers' business has been low and will continue to be in the face of large stocks. Prices of poultry wire have weakened.

## . . . BOSTON. . .

***. . . Pig iron buying at standstill except for export.***

BOSTON, Oct. 5.—With a further curtailment in foundry operations has come almost a stoppage of pig iron buying for domestic consumption. In contrast, the export market is fairly lively. A 10,000-ton lot of basic iron has been sold to England and a 550-ton lot of basic to Germany, while other European countries are dickering for tonnages, and Japan, in need of iron, has practically completed credit arrangements. Furnace representatives look for little improvement in the domestic market for the next 60 days, but are quite optimistic for the long pull and see little likelihood of lower pig iron prices.

# . . PHILADELPHIA . .

***. . . District operations off three points to 60 per cent.***

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***. . . Sentiment improves, but orders continue to lag.***

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***. . . Budd will buy 200 tons of stainless for new cars.***

PHILADELPHIA, Oct. 5.—Scattered signs would indicate that sentiment is improving in this area, even though steel sellers still have little to show in the way of improved buying to back up their more encouraging summation of the present situation. No doubt, most district steel consumers are using steel at a faster pace than they are entering replacement orders—so sellers insist there must be a return of better orders in the not-too-distant future. Furthermore, both Budd and Heintz will be up to practically peak schedules by the end of this month, and by that time will be both fabricating and buying quite sizable quantities of steel. Miscellaneous sales are holding up well here, but with mills seeking tonnage there is a tendency for much of this type of business to go directly to the producers rather than through the hands of jobbers and warehouses. All mills in this territory are confident that the railroads will soon have their wage and rate difficulties settled, probably on a basis comparatively satisfactory to the carriers, and such a settlement would naturally release considerable steel tonnage now frozen on producers' books, may result in sizable new orders and could precipitate a bulge in demand from consumers in general, who may wish to avoid paying higher freight rates on their steel requirements.

The reduced demand for steel has again resulted in a scaling down in steel-making activity. Lukens is down to six furnaces, Worth is off to three furnaces, Phoenix is down to two units, and Bethlehem has reduced its operations slightly, the aggregate result being a three-point drop for the entire district, which is now at 60 per cent of capacity.

Newport News Shipbuilding Co. has been awarded the 33,000-ton United States Lines' new trans-Atlantic liner by the Maritime Commission, and releases on this steel will be spread over the next two years. According to reports, the American South African Line, the American Export Steamship Corp., the Black Diamond Line, the New York and Cuba Mail Line, the Matson Line, and many other well-known steamship companies will be among those soon to have new ships up for consideration by the Maritime Commission. Among the inter-coastal carriers, the Calmar Line may soon ask for bids on six 13,000-ton cargo ships. The Virginian Railway has just distributed about 7200 tons of steel among a number of mills on a percentage basis, and this steel will be used for repairing about 1000 coal cars. The same railroad may soon have a sizable rail, tie plate and spike inquiry out for bids.

### *Pig Iron*

Foundries are working at an excellent pace, but still are not in the market for additional commitments in any great volume. However, furnaces continue to deliver on old orders with little or no interruption, and no producer has any growing stock piles in this territory. Considerable quantities of iron continue to leave this port for foreign delivery, the latest shipment being the boat Talatta, carrying 9100 tons to Europe. There has been a tendency for export inquiry to become more urgent during the week, but so far no district seller reports the booking of new business in any volume. No blast furnaces were blown in or out in this territory in the past month. Alan Wood expects to keep its smaller furnace in operation for at least another month to take care of export orders, and both the Colonial and Brooke furnace will probably stay in throughout the winter.

### *Sheets and Strip*

Practically all mills need business, and for this reason delivery promises on all new orders are down to the minimum time required to carry a specification through the mill. New business continues to be very slack, although in several instances sellers report a slight but noticeable pick-up over the business volume of the previous week. The Budd company will have about all its dies prepared by the month's end, and at that time will swing into peak production, the result being heavy consumption of steel followed by sizable replacement orders. The Budd company's car division is even now working near capacity, and has just received an additional 15-car order from the Burlington Railroad. About 200 tons of stainless steel will soon be purchased to cover this construction. Blue annealed sheets are only in moderate demand, and strip, both hot- and cold-rolled, is hardly moving at all.

### *Plates, Shapes and Bars*

District plate producers in certain instances have benefited by a slightly better miscellaneous demand, and in practically all cases there is an expectation of definite improvement in turnover before the end of the year. Fabricated shapes are moving at a volume little changed from the previous weeks, but the outlook is showing just a little more promise. Prices on plain shapes are very firm, although recent bids on fabricated work have shown the results of some extremely close figuring. The same holds true for prices on reinforcing steel, which type of steel has for some time been moving in extremely poor volume. Among the awards of the week, the largest was for 4500 tons of shapes and 925 tons of bars for the Philadelphia Court House, the former going to Fort Pitt Bridge Works and the latter to Sweet's Steel Co., both through McCloskey & Co., general contractor. New projects include 5000 tons for a Finance Building at Harrisburg, Pa., on which bids are due Nov. 3; 250 tons for a grade elimination in North Jersey, on which bids close Oct. 18; and 250 tons for a school at Selinsgrove, Pa., which closes Oct. 13.

# . . .NON-FERROUS. . .

## . . . Copper prices drop to 12c., then rise to 12.75c.

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## . . . Zinc quotations down $15 per ton.

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## . . . Market abroad shows new weakness.

NEW YORK, Oct. 5.—The low level of current non-ferrous quotations has brought forth several short spurts of buying activity during the week, but on the whole the market has been very quiet and buying light. The London Exchange, after showing signs of hardening earlier in the week, broke on heavy liquidation this morning and all quotations abroad moved downward. One of the results of the violent fluctuations in copper prices this summer has been the re-establishment of restrictions on production. The foreign producers' cartel has set 105 per cent of standard as the quota for its members. This is estimated to mean a reduction of about 10,000 tons per month under present production. Domestic copper, after dropping to 12c. per lb. earlier in the week, advanced to $12.75c. per lb., Connecticut Valley, on Monday. Red metal abroad this morning was available at 12.38c. per lb., c.i.f., usual European ports, as compared with 12.61c. on Monday.

### Zinc

Outside of a reduction of $15 per ton last Wednesday in sympathy with the lowered prices of the other metals, the market has been uneventful. The present New York quotation on prime Western is 6.85c. per lb. Sales of prime Western for the week totaled 2115 tons. Shipments of 6858 tons, bringing undelivered stocks down to 85,410 tons, indicate that there has been no letup in consumption.

### Lead

Quotations are unchanged from the previous week at 6.00c. per lb., New York. The market is quiet with a steady tone, and buying has been mostly for October requirements, which are about two-thirds covered. Although November books have been opened, there has been surprisingly little demand for this month. London prices this morning ranged between 4.25c. and 4.28c. per lb., as contrasted with 4.74c. three weeks ago.

### Tin

The market fluctuated violently during the week, dropping 2.125c. on Wednesday, advancing 1.75c. by Monday and declining 1.625c. today to a level of 55.75c. per lb. for Straits metal, New York. An active business was transacted in all positions on each decline. Domestic deliveries in September were 8245 tons, or 665 tons above the previous month. Stocks decreased from 5850 tons in August to 3538 tons in September. Cash Standards in London were down £7 10s. to £242 10s. on first call this morning. Futures were quoted at £241 5s.

**The Week's Prices. Cents Per Pound for Early Delivery**

| | Sept. 29 | Sept. 30 | Oct. 1 | Oct. 2 | Oct. 4 | Oct. 5 |
|---|---|---|---|---|---|---|
| Electrolytic copper, Conn.* | 12.00 | 12.50 | 12.50 | 12.50 | 12.75 | 12.75 |
| Lake copper, N. Y. | 13.125 | 13.125 | 13.125 | 13.125 | 13.125 | 13.125 |
| Straits tin spot, New York | 55.625 | 55.625 | 56.50 | .... | 57.375 | 55.75 |
| Zinc, East St. Louis | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 |
| Zinc, New York | 6.85 | 6.85 | 6.85 | 6.85 | 6.85 | 6.85 |
| Lead, St. Louis | 5.85 | 5.85 | 5.85 | 5.85 | 5.85 | 5.85 |
| Lead, New York | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 18.25c. a lb., prompt, f.o.b., New York.
Antimony, American, 17.375c. per lb., prompt shipment, New York.
Quicksilver, $90.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 13.25c. a lb., less carload, delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

**From New York Warehouse**

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| Tin, Straits pig | 57.50c. to 58.50c. |
| Tin, bar | 59.50c. to 60.50c. |
| Copper, Lake | 14.00c. to 15.00c. |
| Copper, electrolytic | 14.00c. to 15.00c. |
| Copper, castings | 13.75c. to 14.75c. |
| *Copper sheets, hot-rolled | 21.78c. |
| *High brass sheets | 19.75c. |
| *Seamless brass tubes | 22.50c. |
| *Seamless copper tubes | 22.625c. |
| *Brass rods | 16.25c. |
| Zinc, slabs | 8.75c. to 9.75c. |
| Zinc, sheets (No. 9), casks, 1200 lb. and over | 13.00c. |
| Lead, American pig | 7.00c. to 8.00c. |
| Lead, bar | 8.00c. to 9.00c. |
| Lead, sheets, cut | 10.00c. |
| Antimony, Asiatic | 20.00c |
| Alum., virgin, 99 per cent plus | 22.50c. to 24.00c. |
| Alum., No. 1 for remelting, 98 to 99 per cent | 19.50c. to 21.00c. |
| Solder, ½ and ½ | 34.00c. to 35.00c. |
| Babbitt metal, commercial grade | 25.00c. to 65.00c. |

*These prices, which are also for delivery from Chicago and Cleveland warehouses are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

**From Cleveland Warehouse**

*Delivered Prices per Lb.*

| | |
|---|---|
| Tin, Straits pig | 61.625c. |
| Tin, bar | 63.625c. |
| Copper, Lake | 14.00c. to 14.25c. |
| Copper, electrolytic | 14.00c. to 14.25c. |
| Copper, castings | 13.75c. to 14.00c. |
| Zinc, slabs | 8.75c. to 9.00c. |
| Lead, American pig | 6.50c. to 6.75c. |
| Lead, bar | 10.00c. to 10.50c. |
| Antimony, Asiatic | 19.25c. |
| Babbitt metal, medium grade | 25.25c. |
| Babbitt metal, high grade | 65.625c. |
| Solder, ½ and ½ | 39.50c. |

**Old Metals, Per Lb., New York**

*Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)*

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|---|---|
| Copper, hvy. crucible | 10.375c. | 11.125c. |
| Copper, hvy. and wire | 9.75c. | 10.25c. |
| Copper, light and bottoms | 8.75c. | 9.00c. |
| Brass, heavy | 5.625c. | 6.25c. |
| Brass, light | 4.50c. | 5.25c. |
| Hvy. machine composition | 8.50c. | 9.00c. |
| No. 1 yel. brass turnings | 7.00c. | 7.50c. |
| No. 1 red brass or compos. turnings | 8.25c. | 8.75c. |
| Lead, heavy | 5.00c. | 5.375c. |
| Cast aluminum | 12.125c. | 13.25c. |
| Sheet aluminum | 13.25c. | 14.75c. |
| Zinc | 4.00c. | 4.375c. |

***September Average Prices***

| | |
|---|---|
| Electrolytic copper, Connecticut Valley | 13.78c. per lb. |
| Lake copper, Eastern delivery | 13.965c. per lb. |
| Straits tin, spot, New York | 58.636c. per lb. |
| Zinc, East St. Louis | 7.19c. per lb. |
| Zinc, New York | 7.54c. per lb. |
| Lead, St. Louis | 6.25c. per lb. |
| Lead, New York | 6.40c. per lb. |

## Ford Motor Co. To Build Blast Furnace

THE Ford Motor Co., Detroit, has awarded a contract to Arthur G. McKee & Co., Cleveland, for the construction of a new blast furnace, details of which have not yet been announced by the Ford company.

# IRON AND STEEL SCRAP

## . . . Composite drops 67c. to $16.91, low point of year.

OCT. 5. — Throughout the country buying of scrap is virtually at a standstill, and with the mills out of the market for over a month now, dealers are showing no interest in picking up material even at the current low prices. While prices are largely nominal, based on dealer bids, prices have declined from 50c. to $1 a ton in the leading centers, except at Pittsburgh, where the price on No. 1 heavy melting steel is unchanged at $17.50 to $18. As a result of declines of $1 at Chicago and Pittsburgh, however, THE IRON AGE composite price for No. 1 steel has fallen 67c. from last week to $16.91, a new low for the year, but still above the corresponding figure for last year, $16.75. The current figure represents a drop of $5.01 from the high of $21.92 reached on March 30.

### *Pittsburgh*

Transactions on the part of dealers and consumers are at a virtual standstill. The leading interest has again placed an embargo on all shipments to its plants and an independent consumer continues its embargo. It is expected that the closing of railroad lists this week will give some measure of clarification to present quotations which are purely nominal.

### *Chicago*

Lack of consumer interest has caused brokers' bids to slip as low as $15.25 in some instances for No. 1 steel, and deals are being consummated regularly with dealers at $15.50. Railroad steel sold last week for $15.68 a gross ton delivered, and No. 1 steel, is being quoted at $15.50 to $16. The trade is hopeful of mill buying in the next week or so, but no definite assurance has been given of such an occurrence. At the moment trading is at a standstill and about all the scrap that is moving is on old contracts.

### *Cleveland*

Prices have further declined 50c. to $1 a ton on steelmaking grades in both the Cleveland and Youngstown districts. Blast furnace scrap is down 25c. a ton. The market continues inactive, and not having the support of a consumer demand, still has a weak tone. Severe restrictions of shipment by Youngstown district mills remain in effect. Current railroad lists are attracting more than usual attention as the prices the scrap brings may tend to clear up the present unsettled price situation. The New York Central Railroad will take bids Oct. 8 on 9000 to 10,000 tons of heavy melting steel.

### *Buffalo*

The largest consumer bought several medium-sized lots on a basis of $17.50 for the No. 1 heavy melting steel and $15.50 for No. 2, and is now out of the market. This consumer is holding up shipments and probably will continue to do so for at least another week. Holdup is due to heavy water receipts which included four steamer loads (20,000 tons) between the weekend and Tuesday and six barge-loads (2400 tons) within a similar period. The previous week this plant received 20,000 tons of scrap and the week previous to that, 12,000 tons. Those dealers who are inclined to view the market softening as temporary, see foundries using a greater percentage of scrap in their mixtures, and a shortage of incoming scrap to yards. Most prices quoted are nominal.

### *Cincinnati*

Mill refusal to take old materials except at a price, caused further softness in the market the past week. Shipments also declined as mills tended to hold up specifications against commitments. Foundry scrap also tended dull as melters took their cues from steel interests. Dealers reduced bids and are biding their time in anticipation of improvement 60 days hence.

### *Boston*

The lone buyer, the Weirton Steel Co., dropped its price on steel turnings 50c. a ton to $7.45 on cars shipping points, and then held up shipments. Another mill is offering $9.45 a ton, f.o.b. for bundled skeleton, which compares with the last previous reported sale at $11.25. Otherwise prices for domestic delivered scrap are nominal due to a lack of business. Exporters have dropped prices on No. 1 heavy melting steel from $17.00 to $17.50 a ton delivered waterfront to $16.00, and on No. 2 steel proportionately. The most noteworthy development in the export market, however, is the resumption of buying, following two months of inactivity, by Japan. A boat is now loading 7000 tons for that country.

### *St. Louis*

The scrap iron business is about at a standstill in St. Louis. The steel mills in the district are not buying and are giving no encouragement as to when they will resume buying. The mills are said to be well supplied with scrap iron, and there has been a falling off in their orders, resulting in a decreased rate of operations. Dealers say that there is no distress scrap, and offerings from the railroads are light, the week being without lists. Prices again are lower than the preceding week.

### *Detroit*

With the principal consumers in this area and surrounding territory displaying no interest in offerings, the Detroit scrap market slumped another dollar this week. It is generally conceded that the bottom is not in sight. Heavy offerings a week ago found many who had bid low in possession of scrap for which they had no disposal. There is possibility that scrap may be laid down on docks here as a result. Only one dealer is known to have been buying to fill orders. Most of the others are definitely holding out awaiting developments. Greatest stagnation of all items is apparent in blast furnace material.

### *Philadelphia*

With buyers ignoring the market completely, all the Philadelphia yards still closed down by strikes, and with sentiment discouraged by the persistent downward drift in steel-making operations, the undertone for scrap is naturally very much on the soft side. No. 1 steel has been arbitrarily marked down to $17 to $17.50, and No. 2 down to $15 to $15.50, although even at these comparatively attractive figures there is no district consumer willing to take on additional commitments at the moment. The Budd company October list of 4000 tons of compressed bundles has been split up, part going to Pencoyd and part to a broker, the bid prices being estimated at about $16.75 to $17 f.o.b.

### *New York*

The market is softer and dealers have again lowered their buying prices, although these are largely nominal since practically no transactions have been made. No mill sales have been consummated and dealers do not appear even anxious to induce mills to buy in the present market condition. Because of this lack of interest as well as action, prices offered vary widely and present quotations strike the average. What material is being received on old orders is being scrutinized minutely. Forward movement of export scrap is being slowed up by a shortage of ocean bottoms, and dealers have lowered their buying prices for this material 50c. to $1 a ton. Only three ships were chartered for this purpose in the last week.

# Iron and Steel Scrap Prices

## PITTSBURGH

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy mltng. steel | $17.50 to $18.00 |
| Railroad hvy. mltng. | 18.50 to 19.00 |
| No. 2 hvy. mltng. steel | 15.50 to 16.00 |
| No. 2 RR. wrought | 17.50 to 18.00 |
| Scrap rails | 18.50 to 19.00 |
| Rails 3 ft. and under | 22.50 to 23.00 |
| Comp. sheet steel | 17.50 to 18.00 |
| Hand bundled sheets | 16.50 to 17.00 |
| Hvy. steel axle turn. | 16.00 to 16.50 |
| Machine shop turn. | 12.50 to 13.00 |
| Short shov. turn. | 13.50 to 14.00 |
| Mixed bor. & turn. | 13.50 to 14.00 |
| Cast iron borings | 13.50 to 14.00 |
| Cast iron carwheels | 19.50 to 20.00 |
| Hvy. breakable cast. | 15.00 to 15.50 |
| No. 1 cupola cast | 18.50 to 19.00 |
| RR. knuckles & cplrs. | 22.50 to 23.00 |
| Rail coil & leaf springs | 22.50 to 23.00 |
| Rolled steel wheels | 22.50 to 23.00 |
| Low phos. billet crops | 22.50 to 23.00 |
| Low phos. sh. bar | 22.00 to 22.50 |
| Low phos. punchings | 19.50 to 20.00 |
| Low phos. plate, hvy. | 21.00 to 22.00 |
| Low phos. plate clips | 19.50 to 20.00 |
| Steel car axles | 23.00 to 23.50 |

## PHILADELPHIA

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $17.00 to $17.50 |
| No. 2 hvy. mltng. steel | 15.00 to 15.50 |
| Hydraulic bund., new | 17.00 to 17.50 |
| Hydraulic bund., old | 13.00 to 13.50 |
| Steel rails for rolling | 20.50 to 21.00 |
| Cast iron carwheels | 20.00 to 20.50 |
| Hvy. breakable cast. | 18.00 to 18.50 |
| No. 1 cast | 19.50 to 20.00 |
| Stove plate (steel wks.) | 15.50 to 16.00 |
| Railroad malleable | 19.00 to 20.00 |
| Machine shop turn. | 13.00 to 13.50 |
| No. 1 blast furnace | 11.50 to 12.00 |
| Cast borings | 12.00 to 12.50 |
| Heavy axle turnings | 14.50 to 15.00 |
| No. 1 low phos. hvy. | 23.50 to 24.00 |
| Couplers & knuckles | 23.50 to 24.00 |
| Rolled steel wheels | 23.50 to 24.00 |
| Steel axles | 27.00 to 27.50 |
| Shafting | 23.50 to 24.00 |
| No. 1 RR. wrought | 19.50 to 20.00 |
| Spec. iron & steel pipe | 16.00 to 16.50 |
| No. 1 forge fire | 16.00 to 16.50 |
| Cast borings (chem.) | 14.50 to 15.00 |

## CHICAGO

**Delivered to Chicago district consumers:**

| | *Per Gross Ton* |
|---|---|
| Hvy. mltng. steel | $15.50 to $16.00 |
| Auto. hvy. mltng. steel, alloy free | 14.00 to 14.50 |
| No. 3 auto. steel | 12.00 to 13.00 |
| Shoveling steel | 15.50 to 16.00 |
| Hydraul. comp. sheets | 14.50 to 15.00 |
| Drop forge flashings | 12.50 to 13.00 |
| No. 1 busheling | 14.50 to 15.00 |
| Rolled carwheels | 19.75 to 20.25 |
| Railroad tires, cut | 19.25 to 19.75 |
| Railroad leaf springs | 19.25 to 19.75 |
| Steel coup. & knuckles | 18.75 to 19.25 |
| Axle turnings | 14.75 to 15.25 |
| Coil springs | 20.75 to 21.25 |
| Axle turn. (elec.) | 15.75 to 16.25 |
| Low phos. punchings | 19.25 to 19.75 |
| Low phos. plates, 12 in. and under | 19.75 to 20.25 |
| Cast iron borings | 9.75 to 10.25 |
| Short shov. turnings | 10.50 to 11.00 |
| Machine shop turn. | 8.50 to 9.00 |
| Rerolling rails | 18.00 to 18.50 |
| Steel rails under 3 ft. | 18.50 to 19.00 |
| Steel rails under 2 ft. | 19.00 to 19.50 |
| Angle bars, steel | 17.50 to 18.00 |
| Cast iron carwheels | 17.00 to 17.50 |
| Railroad malleable | 16.75 to 17.25 |
| Agric. malleable | 14.25 to 14.75 |
| | *Per Net Ton* |
| Iron car axles | $22.25 to $22.75 |
| Steel car axles | 22.25 to 22.75 |
| No. 1 RR. wrought | 13.50 to 14.00 |
| No. 2 RR. wrought | 13.75 to 14.25 |
| No. 2 busheling, old | 7.25 to 7.75 |
| Locomotive tires | 17.25 to 17.75 |
| Pipes and flues | 11.75 to 12.25 |
| No. 1 machinery cast. | 13.25 to 13.75 |
| Clean auto. cast | 13.25 to 13.75 |
| No. 1 railroad cast | 12.25 to 12.75 |
| No. 1 agric. cast | 11.75 to 12.25 |
| Stove plate | 10.25 to 10.75 |
| Grate bars | 10.75 to 11.25 |
| Brake shoes | 10.75 to 11.25 |

## YOUNGSTOWN

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $17.50 to $18.00 |
| Hydraulic bundles | 17.00 to 17.50 |
| Machine shop turn. | 13.50 to 14.00 |

## CLEVELAND

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $17.00 to $17.50 |
| No. 2 hvy. mltng. steel | 16.00 to 16.50 |
| Comp. sheet steel | 16.50 to 17.00 |
| Light bund. stampings | 13.00 to 13.50 |
| Drop forge flashings | 16.00 to 16.50 |
| Machine shop turn. | 11.50 to 12.00 |
| Short shov. turn. | 12.50 to 13.00 |
| No. 1 busheling | 16.50 to 17.00 |
| Steel axle turnings | 14.00 to 14.50 |
| Low phos. billet and bloom crops | 23.00 to 23.50 |
| Cast iron borings | 12.50 to 13.00 |
| Mixed bor. & turn. | 12.50 to 13.00 |
| No. 2 busheling | 12.00 to 12.50 |
| No. 1 cast | 19.00 to 19.50 |
| Railroad grate bars | 11.50 to 12.00 |
| Stove plate | 11.00 to 11.50 |
| Rails under 3 ft. | 21.00 to 21.50 |
| Rails for rolling | 19.00 to 19.50 |
| Railroad malleable | 22.00 to 22.50 |
| Cast iron carwheels | 21.00 |

## BUFFALO

**Per gross ton, f.o.b. consumers' plants:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $17.50 to $18.00 |
| No. 2 hvy. mltng. steel | 15.50 to 16.00 |
| Scrap rails | 17.50 to 18.00 |
| New hvy. bindled sheet | 15.50 to 16.00 |
| Old hydraul. bundles | 14.50 to 15.00 |
| Drop forge flashings | 15.50 to 16.00 |
| No. 1 busheling | 15.50 to 16.00 |
| Hvy. axle turnings | 13.00 to 13.50 |
| Machine shop turn. | 11.50 to 12.00 |
| Knuckles & couplers | 20.00 to 20.50 |
| Coil & leaf springs | 20.00 to 20.50 |
| Rolled steel wheels | 20.00 to 20.50 |
| Low phos. billet crops | 20.50 to 21.00 |
| Shov. turnings | 12.50 to 13.00 |
| Mixed bor. & turn. | 11.00 to 11.50 |
| Cast iron borings | 11.50 to 12.00 |
| Steel car axles | 18.50 to 19.00 |
| No. 1 machinery cast | 17.50 to 18.00 |
| No. 1 cupola cast | 16.00 to 16.50 |
| Stove plate | 11.50 to 12.00 |
| Steel rails under 3 ft. | 20.50 to 21.00 |
| Cast iron carwheels | 15.00 to 15.50 |
| Railroad malleable | 18.50 to 19.00 |
| Chemical borings | 12.00 to 12.50 |

## ST. LOUIS

**Dealers' buying prices per gross ton delivered to consumer:**

| | |
|---|---|
| Selected hvy. melting | $16.50 to $17.00 |
| No. 1 hvy. melting | 16.00 to 16.50 |
| No. 2 hvy. melting | 14.00 to 14.50 |
| No. 1 locomotive tires | 19.00 to 19.50 |
| Misc. stand.-sec. rails | 17.50 to 18.00 |
| Railroad springs | 21.00 to 21.50 |
| Bundled sheets | 11.50 to 12.00 |
| No. 1 busheling | 11.50 to 12.00 |
| Cast bor. & turn. | 8.00 to 8.50 |
| Rails for rollings | 19.00 to 19.50 |
| Machine shop turn. | 8.00 to 8.50 |
| Heavy turnings | 13.50 to 14.00 |
| Steel car axles | 21.50 to 22.00 |
| Iron car axles | 21.50 to 22.00 |
| No. 1 RR. wrought | 13.00 to 13.50 |
| No. 2 RR. wrought | 16.50 to 17.00 |
| Steel rails under 3 ft. | 19.50 to 20.00 |
| Steel angle bars | 18.00 to 18.50 |
| Cast iron carwheels | 17.50 to 18.00 |
| No. 1 machinery cast | 13.25 to 13.75 |
| Railroad malleable | 16.00 to 16.50 |
| No. 1 railroad cast | 13.25 to 13.75 |
| Stove plate | 12.00 to 12.50 |
| Agricul. malleable | 12.50 to 13.00 |
| Grate bars | 12.00 to 12.50 |
| Brake shoes | 12.00 to 12.50 |

## CINCINNATI

**Dealers' buying prices per gross ton:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $13.50 to $14.00 |
| No. 2 hvy. mltng. steel | 10.50 to 11.00 |
| Scrap rails for mltng. | 17.50 to 18.00 |
| Loose sheet clippings | 9.50 to 10.00 |
| Hydrau. b'ndled sheets | 13.50 to 14.00 |
| Cast iron borings | 7.00 to 7.50 |
| Machine shop turn. | 8.50 to 9.00 |
| No. 1 busheling | 11.50 to 12.00 |
| No. 2 busheling | 6.00 to 6.50 |
| Rails for rolling | 19.50 to 20.00 |
| No. 1 locomotive tires | 16.00 to 16.50 |
| Short rails | 20.00 to 20.50 |
| Cast iron carwheels | 14.50 to 15.00 |
| No. 1 machinery cast | 13.50 to 14.00 |
| No. 1 railroad cast | 12.00 to 12.50 |
| Burnt cast | 8.50 to 9.00 |
| Stove plate | 8.50 to 9.00 |
| Agricult. malleable | 13.50 to 14.00 |
| Railroad malleable | 15.50 to 16.00 |
| Mixed hvy. cast. | 10.00 to 10.50 |

## BIRMINGHAM

**Per gross ton delivered to consumer:**

| | |
|---|---|
| Hvy. melting steel | $16.00 to $16.50 |
| Scrap steel rails | 17.00 |
| Short shov. turnings | 8.50 |
| Stove plate | 10.50 |
| Steel axles | 18.00 to 19.00 |
| Iron axles | 15.50 to 18.00 |
| No. 1 RR. wrought | 13.00 to 15.00 |
| Rails for rolling | 18.00 to 20.00 |
| No. 1 cast | 16.00 to 18.00 |
| Tramcar wheels | 16.00 to 18.00 |

## DETROIT

**Dealers' buying prices per gross ton:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $13.50 to $14.00 |
| No. 2 hvy. mltng. steel | 12.50 to 13.00 |
| Borings and turnings | 9.75 to 10.25 |
| Long turnings | 9.50 to 10.00 |
| Short shov. turnings | 11.00 to 11.50 |
| No. 1 machinery cast | 14.50 to 15.00 |
| Automotive cast | 15.50 to 16.00 |
| Hvy. breakable cast | 13.00 to 13.50 |
| Hydraul. comp. sheets | 14.50 to 15.00 |
| Stove plate | 9.50 to 10.00 |
| New factory bushel | 13.50 to 14.00 |
| Old No. 2 busheling | 9.00 to 9.50 |
| No. 2 busheling (black fender stock) | 11.25 to 11.75 |
| Sheet clippings | 11.25 to 11.75 |
| Flashings | 13.50 to 14.00 |
| Low phos. plate scrap | 15.50 to 16.00 |

## NEW YORK

**Dealers' buying prices per gross ton on cars:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $13.50 to $14.00 |
| No. 2 hvy. mltng. steel | 12.00 to 12.50 |
| Hvy. breakable cast | 13.50 to 14.00 |
| No. 1 machinery cast | 15.00 to 15.50 |
| No. 2 cast | 13.00 to 13.50 |
| Stove plate | 11.00 to 11.50 |
| Steel car axles | 25.00 to 25.50 |
| Shafting | 18.50 to 19.00 |
| No. 1 RR. wrought | 15.50 to 16.00 |
| No. 1 wrought long | 15.00 to 15.50 |
| Spec. iron & steel pipe | 13.00 to 13.50 |
| Rails for rolling | 17.50 to 18.00 |
| Clean steel turnings | 9.25 to 9.75 |
| Cast borings | 8.50 to 9.00 |
| No. 1 blast furnace | 8.00 to 8.50 |
| Cast borings (chem.) | 12.50 to 13.00 |
| Unprepar. yard scrap | 10.50 to 11.50 |

**Per gross ton, delivered local foundries:**

| | |
|---|---|
| No. 1 machn. cast | $17.50 to $18.50 |
| No. 1 hvy. cast cupola | 14.50 to 15.00 |
| No. 2 cast | 14.00 to 14.50 |

## BOSTON

**Dealers' buying prices per gross ton:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $14.80 to $15.30 |
| Scrap rails | 14.80 to 15.30 |
| No. 2 steel | 12.80 to 14.30 |
| Breakable cast | 13.00 to 13.50 |
| Machine shop turn. | 7.45 |
| Mixed bor. & turn. | 7.45 |
| Bund. skeleton long | 9.45 |
| Shafting | 13.00 to 13.25 |
| Cast bor. chemical | 9.00 to 10.00 |

**Per gross ton delivered consumers' yards:**

| | |
|---|---|
| Textile cast | $18.00 to $19.00 |
| No. 1 machine cast | 18.00 to 19.00 |

## PACIFIC COAST

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. mltng. steel | $14.00 to $15.00 |
| No. 2 hvy. mltng. steel | 11.50 |

## CANADA

**Dealers' buying prices at their yards, per gross ton:**

| | Toronto | Montreal |
|---|---|---|
| No. 1 hvy. mltng. stl. | $14.50 | $14.00 |
| No. 2 hvy. mltng. stl. | 13.50 | 13.00 |
| Mixed dealers steel | 12.50 | 12.00 |
| Scrap pipe | 11.75 | 11.50 |
| Steel turnings | 9.75 | 9.50 |
| Cast borings | 11.00 | 10.50 |
| Machinery cast | 18.00 | 17.00 |
| Dealers cast | 16.00 | 15.00 |
| Stove plate | 13.00 | 11.00 |

## EXPORT

**Dealers' buying prices per gross ton:**

*New York, truck lots, delivered, barges.*

| | |
|---|---|
| No. 1 hvy. mltng. steel | $15.00 to $15.50 |
| No. 2 hvy. mltng. steel | 14.00 to 14.50 |
| No. 2 cast | 13.00 to 13.50 |
| Stove plate | 11.00 to 11.50 |

*Boston on cars at Army Base or Mystic Wharf*

| | |
|---|---|
| No. 1 hvy. mltng. steel | $16.00 |
| No. 2 hvy. mltng. steel | 15.00 |
| Rails (scrap) | 16.00 |

*Philadelphia, delivered alongside boats, Port Richmond*

No market at present.

# PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

## SEMI-FINISHED STEEL

**Billets, Blooms and Slabs**

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

| | *Per Gross Ton* |
|---|---|
| Rerolling | $37.00 |
| Forging quality | 42.00 |

**Sheet Bars**

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

| | *Per Gross Ton* |
|---|---|
| Open-hearth or Bessemer | $37.00 |

**Skelp**

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

| | *Per Lb.* |
|---|---|
| Grooved, universal and sheared | 2.10c. |

**Wire Rods**
(No. 5 to 9/32 in.)

| | *Per Gross Ton* |
|---|---|
| F.o.b. Pittsburgh or Cleveland | $47.00 |
| F.o.b. Chicago, Youngstown or Anderson, Ind. | 48.00 |
| F.o.b. Worcester, Mass. | 49.00 |
| F.o.b. Birmingham | 50.00 |
| F.o.b. San Francisco | 56.00 |
| F.o.b. Galveston | 53.00 |

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

## BARS, PLATES, SHAPES

**Iron and Steel Bars**

*Soft Steel*

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 2.45c. |
| F.o.b. Chicago or Gary | 2.50c. |
| F.o.b. Duluth | 2.60c. |
| Del'd Detroit | 2.60c. |
| F.o.b. Cleveland | 2.50c. |
| F.o.b. Buffalo | 2.55c. |
| Del'd Philadelphia | 2.74c. |
| Del'd New York | 2.78c. |
| F.o.b. Birmingham | 2.60c. |
| F.o.b. cars dock Gulf ports | 2.85c. |
| F.o.b. cars Pacific Ports | 3.00c. |

*Rail Steel*
(For merchant trade)

| | |
|---|---|
| F.o.b. Pittsburgh | 2.30c. |
| F.o.b. Cleveland, Chicago, Gary or Moline, Ill. | 2.35c. |
| F.o.b. Buffalo | 2.40c. |
| F.o.b. Birmingham | 2.45c. |
| F.o.b. cars dock Gulf ports | 2.70c. |
| F.o.b. cars dock Pacific ports | 2.85c. |

*Billet Steel Reinforcing*
(Straight lengths as quoted by distributers)

| | |
|---|---|
| F.o.b. Pittsburgh | 2.55c. |
| F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham | 2.60c. |
| Del'd Detroit | 2.70c. |
| F.o.b. cars dock Gulf ports | 2.95c. |
| F.o.b. cars dock Pacific ports | 2.95c. |

*Rail Steel Reinforcing*
(Straight lengths as quoted by distributers)

| | |
|---|---|
| F.o.b. Pittsburgh | 2.40c. |
| F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham | 2.45c. |
| F.o.b. cars dock Gulf ports | 2.80c. |
| F.o.b. cars dock Pacific ports | 2.80c. |

*Iron*

| | |
|---|---|
| F.o.b. Chicago | 2.40c. |
| F.o.b. Pittsburgh (refined) | 3.60c. |

**Cold Finished Bars and Shafting***

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 2.90c. |
| F.o.b. Cleveland, Chicago and Gary | 2.95c. |
| F.o.b. Buffalo | 3.00c. |
| F.o.b. Detroit | 2.95c. |

* In quantities of 10,000 to 19,999 lb.

**Plates**

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 2.25c. |
| F.o.b. Chicago or Gary | 2.30c. |
| Del'd Cleveland | 2.435c. |
| F.o.b. Coatesville or Spar. Pt. | 2.35c. |
| Del'd Philadelphia | 2.435c. |
| Del'd New York | 2.53c. |
| F.o.b. Birmingham | 2.40c. |
| F.o.b. cars dock Gulf ports | 2.65c. |
| F.o.b. cars dock Pacific ports | 2.80c. |
| Wrought iron plates, f.o.b. Pittsburgh | 3.80c. |

**Floor Plates**

| | |
|---|---|
| F.o.b. Pittsburgh | 3.50c. |
| F.o.b. Chicago | 3.55c. |
| F.o.b. Coatesville | 3.60c. |
| F.o.b. cars dock Gulf ports | 3.90c. |
| F.o.b. cars dock Pacific ports | 4.05c. |

**Structural Shapes**

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 2.25c. |
| F.o.b. Chicago | 2.30c. |
| Del'd Cleveland | 2.435c. |
| F.o.b. Buffalo or Bethlehem | 2.35c. |
| Del'd Philadelphia | 2.455c. |
| Del'd New York | 2.5025c. |
| F.o.b. Birmingham (standard) | 2.40c. |
| F.o.b. cars dock Gulf ports | 2.65c. |
| F.o.b. cars dock Pacific ports | 2.80c. |

**Steel Sheet Piling**

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 2.60c. |
| F.o.b. Chicago or Buffalo | 2.70c. |
| F.o.b. cars dock Gulf or Pacific Coast ports | 3.05c. |

## RAILS AND TRACK SUPPLIES

**F.o.b. Mill**

| | |
|---|---|
| Standard rails, heavier than 60 lb., per gross ton | $42.50 |
| Angle bars, per 100 lb. | 2.30 |

**F.o.b. Basing Points**

| | |
|---|---|
| Light rails (from billets) per gross ton | $43.00 |
| Light rails (from rail steel) per gross ton | 42.00 |

| | *Base per Lb.* |
|---|---|
| Spikes | 3.15c. |
| Tie plates, steel | 2.30c. |
| Tie plates, Pacific Coast ports | 2.40c. |
| Track bolts, to steam railroads | 4.35c. |
| Track bolts, to jobbers, all sizes (per 100 counts) | 65-5 per cent off list |

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

## SHEETS, STRIP, TIN PLATE TERNE PLATE

**Sheets**

*Hot Rolled*

| | *Base per Lb.* |
|---|---|
| No. 10, f.o.b. Pittsburgh | 2.40c. |
| No. 10, f.o.b. Gary | 2.50c. |
| No. 10, del'd Detroit | 2.60c. |
| No. 10, del'd Philadelphia | 2.69c. |
| No. 10, f.o.b. Granite City | 2.60c. |
| No. 10, f.o.b. Birmingham | 2.55c. |
| No. 10, f.o.b. cars dock Pacific ports | 2.95c. |
| No. 10 wrought iron, Pgh. | 4.25c. |

*Hot-Rolled Annealed*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 3.15c. |
| No. 24, f.o.b. Gary | 3.25c. |
| No. 24, del'd Detroit | 3.35c. |
| No. 24, del'd Philadelphia | 3.44c. |
| No. 24, f.o.b. Granite City | 3.35c. |
| No. 24, f.o.b. Birmingham | 3.30c. |
| No. 24, f.o.b. cars dock Pacific ports | 3.80c. |
| No. 24, wrought iron, Pittsburgh | 5.15c. |

*Heavy Cold-Rolled*

| | |
|---|---|
| No. 10 gage, f.o.b. Pittsburgh | 3.10c. |
| No. 10 gage, f.o.b. Gary | 3.20c. |
| No. 10 gage, f.o.b. Detroit | 3.30c. |
| No. 10 gage, del'd Philadelphia | 3.39c. |
| No. 10, f.o.b. Granite City | 3.30c. |
| No. 10 gage, f.o.b. Birmingham | 3.25c. |
| No. 10 gage, f.o.b. cars dock Pacific ports | 3.70c. |

*Light Cold-Rolled*

| | |
|---|---|
| No. 20 gage, f.o.b. Pittsburgh | 3.55c. |
| No. 20 gage, f.o.b. Gary | 3.65c. |
| No. 20 gage, del'd Detroit | 3.75c. |
| No. 20 gage, del'd Philadelphia | 3.84c. |
| No. 20, f.o.b. Granite City | 3.75c. |
| No. 20 gage, f.o.b. Birmingham | 3.70c. |
| No. 20 gage, f.o.b. cars, dock, Pacific ports | 4.10c. |

*Galvanized Sheets*

| | |
|---|---|
| No. 24 gage, f.o.b. Pittsburgh | 3.80c. |
| No. 24, f.o.b. Gary | 3.90c. |
| No. 24, del'd Philadelphia | 4.09c. |
| No. 24, f.o.b. Granite City | 4.00c. |
| No. 24, f.o.b. Birmingham | 3.95c. |
| No. 24, f.o.b. cars, dock, Pacific ports | 4.40c. |
| No. 24, wrought iron, Pittsburgh | 6.10c. |

**Electrical Sheets**
*(F.o.b. Pittsburgh)*

| | *Base per Lb.* |
|---|---|
| Field grade | 3.35c. |
| Armature | 3.70c. |
| Electrical | 4.20c. |
| Special Motor | 5.10c. |
| Special Dynamo | 5.80c. |
| Transformer | 6.30c. |
| Transformer Special | 7.30c. |
| Transformer Extra Special | 7.80c. |

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

*Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.*

*Long Ternes*

| | |
|---|---|
| No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh | 4.10c. |
| F.o.b. Gary | 4.20c. |
| F.o.b. cars, dock, Pacific ports | 4.30c. |

*Vitreous Enameling Stock*

| | |
|---|---|
| No. 20, f.o.b. Pittsburgh | 3.50c. |
| No. 20, f.o.b. Gary | 3.60c. |
| No. 20, f.o.b. Granite City | 3.70c. |
| No. 20, f.o.b. cars dock Pacific ports | 4.10c. |

*Tin Mill Black Plate*

| | |
|---|---|
| No. 28, f.o.b. Pittsburgh, per lb. | 3.30c. |
| No. 28, Gary | 3.40c. |
| No. 28, f.o.b. Granite City | 3.50c. |
| No. 28, cars dock Pacific ports, boxed | 4.175c. |

**Tin Plate**

| | *Base per Box* |
|---|---|
| Standard cokes, f.o.b. Pittsburgh district mill | $5.35 |
| Standard cokes, f.o.b. Gary | 5.45 |
| Standard coke, f.o.b. Granite City | 5.55 |

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

**Special Coated Manufacturing Ternes**

| | *Base per Box* |
|---|---|
| F.o.b. Pittsburgh | *$4.65 |
| F.o.b. Gary | * 4.75 |
| F.o.b. Granite City | 4.85 |

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

**Roofing Terne Plate**
*(F.o.b. Pittsburgh)*
(Per Package, 112 sheets, 20 x 28 in.)

| | |
|---|---|
| 8-lb. coating I.C. | $12.00 |
| 15-lb. coating I.C. | 14.00 |
| 20-lb. coating I.C. | 15.00 |
| 25-lb. coating I.C. | 16.00 |
| 30-lb. coating I.C. | 17.25 |
| 40-lb. coating I.C. | 19.50 |

**Hot-Rolled Hoops, Bands, Strip and Flats under ¼ In.**

| | *Base per Lb.* |
|---|---|
| All widths up to 24 in., Pittsburgh | 2.40c. |
| All widths up to 24 in., Chicago | 2.50c. |
| All widths up to 24 in., del'd Detroit | 2.60c. |
| All widths up to 24 in., Granite City | 2.60c. |
| All widths up to 24 in., Birmingham | 2.55c. |
| Cooperage stock, Pittsburgh | 2.50c. |
| Cooperage stock, Chicago | 2.60c. |

**Cold-Rolled Strip***

| | *Base per Lb.* |
|---|---|
| F.o.b. Pittsburgh | 3.20c. |
| F.o.b. Cleveland | 3.20c. |
| Del'd Chicago | 3.48c. |
| F.o.b. Worcester | 3.40c. |

* Carbon 0.25 and less.

**Cold Rolled Spring Steel**

| | | Pittsburgh and Cleveland | Worcester |
|---|---|---|---|
| Carbon | 0.25-0.50% | 3.20c. | 3.40c. |
| Carbon | .51- .75 | 4.45c. | 4.65c. |
| Carbon | .76-1.00 | 6.30c. | 6.50c. |
| Carbon | Over 1.00 | 8.50c. | 8.70c. |

*Fender Stock*

| | |
|---|---|
| No. 14, Pittsb'gh or Cleveland | 3.45c. |
| No. 20, Pittsb'gh or Cleveland | 3.85c. |

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

*To Manufacturing Trade*

| | Per Lb. |
|---|---|
| Bright wire | 2.90c. |
| Galvanized wire | 2.95c. |
| Spring wire | 3.50c. |

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $5 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

*To the Trade*

| | Base per Keg |
|---|---|
| Standard wire nails | $2.75 |
| Smoth coated nails | $2.75 |
| Cut nails, carloads | $3.60 |

| | Base per 100 Lb. |
|---|---|
| Annealed fence wire | $3.20 |
| Galvanized fence wire | 3.60 |
| Polished staples | 3.45 |
| Galvanized staples | 3.70 |
| Barbed wire, galvanized | 3.40 |
| Twisted barbless wire | 3.40 |
| Woven wire fence, base column. | 74 |
| Single loop bale ties, base col.... | 63 |

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

## STEEL AND WROUGHT IRON PIPE AND TUBING

**Welded Pipe**

**Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills**

F.o.b. Pittsburgh only on wrought iron pipe.

*Butt Weld*

| Steel In. | Black | Galv. | Wrought Iron In. | Black | Galv. |
|---|---|---|---|---|---|
| ⅛ | ....52 | 31 | ¼ & ⅜ | .+13 | +35 |
| ¼ to ⅜ | ..55 | 38½ | ½ | ....20 | 1½ |
| ½ | ....59½ | 49 | ¾ | ....26 | 8 |
| ¾ | ....62½ | 53 | 1 & 1¼ | .30 | 14 |
| 1 to 3 | ...64½ | 55½ | 1½ | ....34 | 16½ |
| | | | 2 | ....33½ | 16 |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | ....57 | 47½ | 2 | ....26½ | 10 |
| 2½ & 3 | ..60 | 50½ | 2½ to 3½ | 27½ | 12½ |
| 3½ to 6 | ..62 | 52½ | 4 | ....29½ | 16 |
| 7 & 8 | ..61 | 50½ | 4½ to 8 | ..28½ | 15 |
| 9 & 10 | ..60½ | 50 | 9 to 12 | ..24½ | 10 |
| 11 & 12 | ..59½ | .49 | | | |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛ | ....50½ | 36½ | ¼ & ⅜ | .+14 | +48 |
| ¼ to ⅜ | ..52½ | 40½ | ½ | ....21 | 4 |
| ½ | ....57½ | 48½ | ¾ | ....27 | 10 |
| ¾ | ....61½ | 52½ | 1 to 2 | ..34 | 17½ |
| 1 to 3 | ....63 | 55 | | | |

*Lap Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | ....55 | 46½ | 2 | ....29½ | 13½ |
| 2½ & 3 | ..59 | 50½ | 2½ to 4 | ..35 | 20½ |
| 3½ to 6 | ..62½ | 54 | 4½ to 6 | ..33½ | 19 |
| 7 & 8 | ..61½ | 51 | 7 & 8 | ..34½ | 19½ |
| 9 & 10 | ..60½ | 50 | 9 to 12 | ..28 | 15½ |
| 11 & 12 | ..59½ | 49 | | | |

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

**Boiler Tubes**

*Seamless Steel Commercial Boiler Tubes and Locomotive Tubes*

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

| | | Cold Drawn | Hot Rolled |
|---|---|---|---|
| 1 in. o.d. | 13 B.W.G. | $ 9.46 | $ 8.41 |
| 1¼ in. o.d. | 13 B.W.G. | 11.21 | 9.96 |
| 1½ in. o.d. | 13 B.W.G. | 12.38 | 11.00 |
| 1¾ in. o.d. | 12 B.W.G. | 14.09 | 12.51 |
| 2 in. o.d. | 13 B.W.G. | 15.78 | 14.02 |
| 2¼ in. o.d. | 13 B.W.G. | 17.60 | 15.62 |
| 2½ in. o.d. | 12 B.W.G. | 19.37 | 17.21 |
| 2¾ in. o.d. | 12 B.W.G. | 21.22 | 18.85 |
| 2¾ in. od. | 12 B.W.G. | 22.49 | 19.98 |
| 3 in. o.d. | 12 B.W.G. | 23.60 | 20.97 |
| 4½ in. o.d. | 10 B.W.G. | 45.19 | 40.15 |
| 3½ in. o.d. | 11 B.W.G. | 29.79 | 26.47 |
| 4 in. o.d. | 10 B.W.G. | 36.96 | 32.83 |
| 5 in. o.d. | 9 B.W.G. | 56.71 | 50.38 |
| 6 in. o.d. | 7 B.W.G. | 87.07 | 77.35 |

Extra for less-carload quantities:

| | | | | | |
|---|---|---|---|---|---|
| 40,000 | lb. or ft. | or over | | | Base |
| 30,000 | lb. or ft. | to | 39,999 | lb. or ft. | 5% |
| 20,000 | lb. or ft. | to | 29,999 | lb. or ft. | 10% |
| 10,000 | lb. or ft. | to | 19,999 | lb. or ft. | 20% |
| 5,000 | lb. or ft. | to | 9,999 | lb. or ft. | 30% |
| 2,000 | lb. or ft. | to | 4,999 | lb. or ft. | 45% |
| Under 2,000 lb. or ft | | | | | 65% |

## CAST IRON WATER PIPE

| | Per Net Ton |
|---|---|
| *6-in. and larger, del'd Chicago. | $55.00 |
| 6-in. and larger, del'd New York | 53.00 |
| *6-in. and larger, Birmingham. | 47.00 |
| 6-in. and larger, f.o.b. dock, San Francisco or Los Angeles.... | 56.00 |
| F.o.b. dock, Seattle | 56.00 |
| 4-in. f.o.b. dock, San Francisco or Los Angeles | 59.00 |
| F.o.b. dock, Seattle | 59.00 |

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

## BOLTS, NUTS, RIVETS, SET SCREWS

**Bolts and Nuts**

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

| | Per Cent Off List |
|---|---|
| Machine and carriage bolts: | |
| ½ in. x 6 in. and smaller | 65 and 5* |
| Larger and longer up to 1 in. | 60 and 10* |
| 1⅛ in. and larger | 60 and 5* |
| Lag bolts | 60 and 10* |
| Plow bolts, Nos. 1, 2, 3 and 7 | 65 and 5 |
| Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped: | |
| ½ in. and smaller | 65 |
| 9/16 in. to 1 in. inclusive | 60 and 5 |
| 1⅛ in. and larger | 60 |

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cnt discount.

| | |
|---|---|
| Semi-finished hexagon nuts, U.S.S. and S.A.E.: | |
| ½ in. and smaller | 60 and 10 |
| 9/16 in. to 1 in. inclusive | 60 and 5 |
| 1⅛ in. and larger | 60 |
| Stove bolts in packages, nuts attached | 70 |
| Stove bolts in packages, with nuts separate | 70 and 10 |
| Stove bolts in bulk | 80 |

* On stove bolts freight is allowed to destination on 200 lb. and over.

**Large Rivets**
(½-in. and larger)

| | Base per 100 Lb. |
|---|---|
| F.o.b. Pittsburgh or Cleveland | $3.60 |
| F.o.b. Chicago or Birmingham | 3.70 |

**Small Rivets**
(7/16-in. and smaller)

| | Per Cent Off List |
|---|---|
| F.o.b. Pittsburgh | 65 and 5 |
| F.o.b. Cleveland | 65 and 5 |
| F.o.b. Chicago and Birmingham | 65 and 5 |

**Cap and Set Screws**
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

| | Per Cent Off List |
|---|---|
| Milled cap screws, 1 in. dia. and smaller | 50 and 10 |
| Milled standard set screws, case hardened, 1 in dia. and smaller | 75 |
| Milled headless set screws, cut thread ⅝ in. and smaller | 75 |
| Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller | 60 |
| Upset set screws, cup and oval points | 75 |
| Milled studs | 65 |

## Alloy and Stainless Steel

**Alloy Steel Blooms, Billets and Slabs**

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $60 a gross ton.

**Alloy Steel Bars**

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

| | |
|---|---|
| Open-hearth grade, base | 3.00c. |
| Delivered, Detroit | 3.15c. |

| S.A.E. Series Numbers | Alloy Differential per 100 lb. |
|---|---|
| 200 (½% Nickel) | $0.35 |
| 2100 (1½% Nickel) | 0.75 |
| 2300 (3½% Nickel) | 1.55 |
| 2500 (5% nickel) | $2.25 |
| 3100 Nickel-chromium | 0.70 |
| 3200 Nickel-chromium | 1.35 |
| 3300 Nickel-chromium | 3.80 |
| 3400 Nickel-chromium | 3.20 |
| 4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum). | 0.55 |
| 4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum). | 0.75 |
| 4600 Nickel - molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni) | 1.10 |
| 5100 Chrome steel (0.60-0.90 Cr.) | 0.35 |
| 5100 Chrome steel (0.80-1.10 Cr.) | 0.45 |
| 5100 Chromium spring steel.... | 0.15 |
| 6100 Chromium-vanadium bar.. | 1.20 |
| 6100 Chromium-vanadium spring steel | 0.35 |
| Chromium-nickel-vanadium ... | 1.50 |
| Carbon-vanadium | 0.35 |

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

**Alloy Cold-Finished Bars**

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

## CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

**Chrome-Nickel**

| | No. 304 | No. 302 |
|---|---|---|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25c. | 24c. |
| Plates | 29c. | 27c. |
| Structural shapes | 25c. | 24c. |
| Sheets | 36c. | 34c. |
| Hot-rolled strip | 23.50c. | 21.50c. |
| Cold-rolled strip | 30c. | 28c. |
| Drawn wire | 25c. | 24c. |

**Straight Chrome**

| | No. 410 | No. 430 | No. 442 | No. 446 |
|---|---|---|---|---|
| Bars | 18.50c. | 19c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29c. | 32.50c. | 36.50c. |
| Hot strip | 17c. | 17.50c. | 23c. | 28c. |
| Cold stp. | 22c. | 22.50c. | 28.50c. | 36.50c. |

## TOOL STEEL

| | |
|---|---|
| High speed | 80c. |
| High-carbon-chrome | 43c. |
| Oil-hardening | 24c. |
| Special | 22c. |
| Extra | 18c. |
| Regular | 14c. |

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

## British and Continental

### BRITISH

**Per Gross Ton**
**f.o.b. United Kingdom Ports**

| | |
|---|---|
| Ferromanganese, export | £20 Nominal |
| Tin plate, per base box | 24s. 9d. to 25s. |
| Steel bars, open-hearth | £11 |
| Beams, open-hearth | £11 2s. 6d. |
| Channels, open-hearth | £11 7s. 6d |
| Angles, open-hearth | £11 2s. 6d. |
| Black sheets, No. 24 gage | £15 |
| Galvanized sheets, No. 24 gage | £18 15s. |

### CONTINENTAL

**Per Gross Ton, Gold f. f.o.b. Continental Ports**

| | |
|---|---|
| Billets, Thomas | £4 7s. 6d. |
| Wire rods, No. 5 B.W.G. | £6 15s. |
| Steel bars, merchant | £6 to £6 5s. |
| Sheet bars | £4 8s. 6d. |
| Plate ¼ in. and up. | £6 17s. 6d. to £7 |
| Plate 3/16 in. and 5 mm. | £7 2s. 6d. |
| Sheet, ⅛ in. | £8 9s. 6d. |
| Beams, Thomas | £5 2s. 6d. |
| Angles (Basic) | £6 2s. 6d. |
| Hoops and strip, base | £7 to £7 5s. |

# IRON AND STEEL WAREHOUSE PRICES

## PITTSBURGH*

| | *Per Net Ton* |
|---|---|
| Plates | 3.70c. |
| Structural shapes | 3.70c. |
| Soft-steel bars and small shapes | 3.80c. |
| Reinforcing steel bars | 3.80c. |
| Cold-finished and screw stock: | |
| Rounds and hexagons | 4.15c. |
| Squares and flats | 4.15c. |
| Hot rolled strip incl. 3/16 in. thick, under 24 in. wide | 4.00c. |
| Hoops | 4.50c. |
| Hot-rolled annealed sheets (No. 24), 10 or more bundles | 4.50c. |
| Galv. sheets (No. 24), 10 or more bundles | 5.15c. |
| Hot-rolled sheets (No. 10) | 3.75c. |
| Galv. corrug. sheets (No. 28), per square (more than 3750 lb.) | $4.48 |
| Spikes, large .....1 to 24 kegs | 3.90c. |
| | *Per Cent Off List* |
| Track bolts, all sizes per 100 count | 55 |
| Machine bolts, 100 count | ** |
| Carriage bolts, 100 count | ** |
| Nuts, all styles, 100 count | ** |
| Large rivets, base per 100 lb. | $4.35 |
| Wire, black, soft ann'l'd, base per 100 lb. | 3.45c. |
| Wire, galv. soft, base per 100 lb. | 3.85c. |
| Common wire nails, per keg | 3.00c. |
| Cement coated nails, per keg | 3.00c. |

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

## CHICAGO *Base per Lb.*

| | |
|---|---|
| Plates and structural shapes | 3.75c. |
| Soft steel bars, rounds | 3.85c. |
| Soft steel bars, squares and hexagons | 4.00c. |
| Cold-fin. steel bars: | |
| Rounds and hexagons | 4.30c. |
| Flats and squares | 4.30c. |
| Hot-rolled strip | 4.10c. |
| Hot-rolled annealed sheets (No. 24) | 4.60c. |
| Galv. sheets (No. 24) | 5.25c. |
| Spikes (keg lots) | $4.40 |
| Track bolts (keg lots) | 5.05 |
| Rivets, structural (keg lots) | **4.95 |
| Rivets, boiler (keg lots) | **5.05 |
| | *Per Cent Off List* |
| Machine bolts and carriage bolts, ½ in. and smaller | 60 |
| Lag screws | *55 and 5 |
| Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller | 60 |
| Hex. head cap screws | 60 |
| Cut point set screws | 75 |
| Flat head bright wood screws | 62 and 20 |
| Spring cotters | 45 |
| Stove bolts in full packages | 72½ |
| Rd. hd. tank rivets, 7/16 in. and smaller | 55 |
| Wrought washers | $4.00 off list |
| Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier) | $4.55 |
| Com. wire nails, 15 kegs or more, per keg | $3.20 |
| Cement c't'd nails, 15 kegs or more, per keg | $3.20 |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

## NEW YORK

| | *Base per Lb.* |
|---|---|
| Plates, ¼ in. and heavier | 4.00c. |
| Structural shapes | 3.97c. |
| Soft steel bars, round | 4.12c. |
| Iron bars, Swed. charcoal | 7.00 to 7.25c. |
| Cold-fin. shafting and screw stock: | |
| Rounds and hexagons | 4.57c. |
| Flats and squares | 4.57c. |
| Cold-rolled; strip, soft and quarter hard | 3.92c. |
| Hoops | 4.32c. |
| Bands | 4.32c. |
| Hot-rolled sheets (No. 10) | 4.00 to 4.07c. |
| Hot-rolled ann'l'd sheets (No. 24*) | 4.50 to 4.32c. |
| Galvanized sheets (No. 24*) | 4.50 to 5.47c. |
| Long terne sheets (No. 24) | 5.50 to 6.20c. |
| Armco iron, galv. (No. 24†) | 6.25c. |
| Toncan iron, galv. (No. 24†) | 6.25c. |
| Galvanneal (No. 24†) | 6.60c. |
| Armco iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Toncan iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Armco iron hot-rolled (No. 10†) | 4.60c. |
| Toncan iron, hot-rolled (No. 10†) | 4.60c. |
| Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb. | |
| Standard quality | 5.40c. |
| Deep drawing | 6.05c. |
| Stretcher leveled | 6.05c. |
| SAE, 2300, hot-rolled | 7.82c. |
| SAE, 3100, hot-rolled | 6.37c. |
| SAE, 6100, hot-rolled, annealed | 10.52c. |
| SAE, 2300, cold-rolled | 9.00c. |
| SAE, 3100, cold-rolled, annealed | 8.35c. |
| Floor plate, ½ in. and heavier | 5.60c. |
| Standard tool steel | 12.50c. |
| Wire, black, annealed (No. 9) | 4.25c. |
| Wire, galv. (No. 9) | 4.60c. |
| Tire steel, 1 x ½ in. and larger | 4.61c. |
| Open-hearth spring steel | 4.75c. to 10.25c. |
| Common wire nails, base per keg | 3.25c. |
| | *Per Cent Off List* |
| Machine bolts, square head and nut: All diameters. Prices on application | |
| Carriage bolts, cut thread: All diameters. Prices on application | |

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

## ST. LOUIS

| | *Base per Lb.* |
|---|---|
| Plates and struc. shapes | 3.99c. |
| Bars, soft steel (rounds and flats) | 4.09c. |
| Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds) | 4.24c. |
| Cold-fin. rounds, shafting, screw stock | 4.54c. |
| Hot-rolled annealed sheets (No. 24) | 4.84c. |
| Galv. sheets (No. 24*) | 5.49c. |
| Hot-rolled sheets (No. 10) | 4.09c. |
| Black corrug. sheets (No. 24*) | 4.89c. |
| 2 galv. corrug. sheets | 5.54c. |
| Structural rivets | 5.29c. |
| Boiler rivets | 5.39c. |
| | *Per Cent Off List* |
| Tank rivets, 7/16 in. and smaller | 50 |
| Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities | 60 |

* No. 26 and lighter take special prices.

## PHILADELPHIA

| | *Base per Lb.* |
|---|---|
| *Plates, ¼-in. and heavier | 3.90c. |
| *Structural shapes | 3.90c. |
| *Soft steel bars, small shapes, iron bars (except bands) | 4.00c. |
| ‡Reinforc. steel bars, sq. twisted and deformed | 3.53c. |
| Cold-finished steel bars | 4.53c. |
| *Steel hoops | 4.35c. |
| *Steel bands, No. 12 and 3/16 in. incl. | 4.10c. |
| *Spring steel | 5.50c. |
| †Hot-rolled anneal. sheets (No. 24) | 4.65c. |
| †Galvanized sheets (No. 24) | 5.30c. |
| *Hot-rolled annealed sheets (No. 10) | 4.00c. |
| *Diam. pat. floor plates, ¼ in. | 5.25c. |

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

## CLEVELAND

| | *Base per Lb.* |
|---|---|
| Plates and struc. shapes | 3.86c. |
| Soft steel bars | 3.75c. |
| †Reinforc. steel bars | 2.60c. |
| ‡Cold-finished steel bars | 4.30c. |
| Hot-rolled strip, 6 in. wide and under | 4.16c. |
| Cold-finished strip | 3.60c. |
| Hot-rolled annealed sheets (No. 24) | 4.66c. |
| Galvanized sheets (No. 24) | 5.31c. |
| Hot-rolled sheets (No. 10) | 3.91c. |
| Hot-rolled 3/16 in. 24 to 48 in. wide sheets | 3.91c. |
| Floor plates, 3/16 in. and heavier | 5.76c. |
| *Black ann'l'd wire, per 100 lb. | $3.40 |
| *No. 9 galv. wire, per 100 lb. | 3.80 |
| *Com. wire nails, base per keg | 2.95 |
| | *Per Cent Off List* |
| Machine and carriage bolts, small | 65 and 5 |
| Large | 60 and 10 |
| Nuts, 100 count | |
| ½ in. and smaller | 65 and 5 |
| 9/16 in. to 1 in. | 60 and 10 |

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and cartage charges and quantity differentials up to 50c.

## CINCINNATI

| | *Base per Lb.* |
|---|---|
| Plates and struc. shapes | 3.95c. |
| Floor plates | 5.55c. |
| Bars, rounds, flats and angles | 4.05c. |
| Other shapes | 4.20c. |
| Rail steel reinforc. bars | 3.75c. |
| Hoops and bands, 3/16 in. and lighter | 4.25c. |
| Cold-finished bars | 4.50c. |
| Hot-rolled annealed sheets (No. 24) 3500 lb. or more | 4.60c. |
| Galv. sheets (No. 24) 3500 lb. or more | $5.25 |
| Hot-rolled sheets (No. 10) | 4.00c. |
| Small rivets | 55 per cent off list |
| No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over) | $3.48 |
| Com. wire nails, base per keg: | |
| Any quantity less than carload | 3.20 |
| Cement c't'd nails, base 100-lb. keg | 3.50 |
| Chain, lin. per 100 lb. | 8.35 |
| | *Net per 100 Ft.* |
| Seamless steel boiler tubes, 2-in. | $21.80 |
| 4-in. | 52.45 |
| Lap-welded steel boiler tubes, 2-in. | 20.73 |
| 4-in. | 48.41 |

## BUFFALO *Base per Lb.*

| | |
|---|---|
| Plates | 3.92c. |
| Floor plates | 5.52c. |
| Struc. shapes | 3.80c. |
| Soft steel bars | 3.90c. |
| Reinforcing bars | 3.10c. |
| Cold-fin. flats and sq. | 4.35c. |
| Rounds and hex. | 4.35c. |
| Cold-rolled strip steel | 3.79c. |
| Hot-rolled annealed sheets (No. 24) | 4.80c. |
| Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide) | 3.97c. |
| Galv. sheet (No. 24) | 5.45c. |
| Bands | 4.22c. |
| Hoops | 4.22c. |
| Heavy hot-rolled sheets | 3.97c. |
| Com. wire nails, base per keg | $3.26 |
| Black wire, base per 100 lb. (2500-lb. lots or under) | 4.55c. |
| (Over 2500 lb.) | 4.45c. |

## BOSTON

| | *Base per Lb.* |
|---|---|
| Channels, angles | 4.20c. |
| Tees and zees, under 3" | 4.45c. |
| H beams and shapes | 4.07c. |
| Plates — Sheared, tank and univ. mill, ¼ thick and heavier | 4.08c. |
| Floor plates, diamond pattern | 5.13c. |
| Bar and bar shapes (mild steel) | 4.20c. |
| Bands 3/16 in. thick and No. 12 ga. incl. | 4.40 to 5.40 |
| Half rounds, half ovals, ovals and bevels | 5.45c. |
| Tire steel | 5.45c. |
| Cold-rolled strip steel | 3.345c. |
| Cold-finished rounds, squares and hexagons | 4.65c. |
| Cold-finished flats | 4.65c. |
| Blue annealed sheets, No. 10 ga. | 3.90c. |
| One pass cold-rolled sheets No. 24 ga. | 4.50c. |
| Galvanized steel sheets, No. 24 ga. | 5.05c. |
| Lead coated sheets, No. 24 ga. | 6.15c. |

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

## DETROIT

| | Base per Lb. |
|---|---|
| Soft steel bars | 3.49c. |
| Structural shapes | 3.95c. |
| Plates | 3.95c. |
| Floor plates | 5.85c. |
| Hot-rolled annealed sheets (No. 24)* | 4.69c. |
| Hot-rolled sheets (No. 10) | 3.94c. |
| Galvanized sheets (No. 24)* | 5.40c. |
| Bands and hoops | 4.19c. |
| Cold-finished bars | 4.30c. |
| Cold-rolled strip | 3.78c. |
| Hot-rolled alloy steel (S.A.E. 3100 Series) | 6.44c. |

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c; 3500 lb. and over, base less 15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

## MILWAUKEE

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.86c. |
| Soft steel bars, rounds up to 8 in., flats and fillet angles | 3.96c. |
| Soft steel bars, squares and hexagons | 4.11c. |
| Hot-rolled strip | 4.21c. |
| Hot-rolled annealed sheets (No. 24) | 4.71c. |
| Galvanized sheets (No. 24) | 5.36c. |
| Cold-finished steel bars | 4.41c. |
| Structural rivets (keg lots) | 5.16c. |
| Boiler rivets, cone head (keg lots) | 5.26c. |
| Track spikes (keg lots) | 4.61c. |
| Track bolts (keg lots) | 5.81c. |
| Black annealed wire (No. 6 to No. 9 incl.) | 4.05c. |
| Com. wire nails and cement coated nails 1 to 14 kegs | 3.25c. |

| | Per Cent Off List |
|---|---|
| Machine bolts and carriage bolts, ½x6 and smaller or shorter | 65 |
| Larger and longer up to 1 in., diam. | 60-5 |
| 1⅛ in. and larger | 60 |
| Coach and lag screws | 60-5 |
| Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb. | 50 |
| 200 lb. and over: | |
| ½ in. and smaller | 62½ |
| 9/16 to 1 in. | 60 |
| 1⅛ in. and over | 50 |

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

## ST. PAUL

| | Base per Lb. |
|---|---|
| Mild steel bars, rounds | 4.10c. |
| Structural shapes | 4.00c. |
| Plates | 4.00c. |
| Cold-finished bars | 4.55c. |
| Hot-rolled annealed sheets, No. 24 | 4.35c. |
| Galvanized sheets, No. 24 | 5.50c. |

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

## BALTIMORE

| | Base per Lb. |
|---|---|
| Mild steel bars and small shapes | 4.00c. |
| Structural shapes | 3.90c. |
| Reinforcing bars, 5 to 15 tons | 3.16c. |
| Plates | 3.90c. |
| Hot-rolled sheets, No. 10 | 3.95c. |
| Bands | 4.20c. |
| Hoops | 4.45c. |
| Special threading steel | 4.15c. |
| Checkered floor plates ¼ in. and heavier | 5.50c. |
| Galvanized sheets, No. 24, 100 bdls. or more | $4.70 |
| Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more | $4.50 |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

## CHATTANOOGA

| | Base per Lb. |
|---|---|
| Mild steel bars | 4.21c. |
| Iron bars | 4.21c. |
| Reinforcing bars | 4.21c. |
| Reinforcing shapes | 4.11c. |
| Plates | 4.11c. |
| Hot-rolled sheets No. 10 | 4.16c. |
| Hot-rolled annealed sheets, No. 24* | 4.06c. |
| Galvanized sheets No. 24* | 4.76c. |
| Steel bands | 4.41c. |
| Cold-finished bars | 4.86c. |

*Plus mill item extra.

## MEMPHIS

| | Base per Lb. |
|---|---|
| Mild steel bars | 4.31c. |
| Shapes, bar size | 4.31c. |
| Iron bars | 4.31c. |
| Structural shapes | 4.21c. |
| Plates | 4.21c. |
| Hot-rolled sheets, No. 10 | 4.26c. |
| Hot-rolled annealed sheets, No. 24 | 4.91c. |
| Galvanized sheets, No. 24 | 5.66c. |
| Steel bands | 4.56c. |
| Cold-drawn rounds | 4.80c. |
| Cold-drawn flats, squares, hexagons | 6.80c. |
| Structural rivets | 5.15c. |
| Bolts and nuts, per cent off list | 55 |
| Small rivets, per cent off list | 55 |

## NEW ORLEANS

| | Base per Lb. |
|---|---|
| Mild steel bars | 4.20c. |
| Reinforcing bars | 3.24c. |
| Structural shapes | 4.10c. |
| Plates | 4.10c. |
| Hot-rolled sheets, No. 10 | 4.35c. |
| Steel bands | 4.75c. |
| Cold-finished steel bars | 5.10c. |
| Structural rivets | 4.35c. |
| Boiler rivets | 4.85c. |
| Common wire nails, base per keg | $3.55 |
| Bolts and nuts, per cent off list | 60 |

## PACIFIC COAST

| | Base per Lb. San Francisco | Los Angeles | Seattle |
|---|---|---|---|
| Plates, tank and U. M. | 4.05c. | 4.30c. | 4.25c. |
| Shapes, standard | 4.05c. | 4.30c. | 4.25c. |
| Soft steel bars | 4.20c. | 4.30c. | 4.45c. |
| Reinforcing bars, f.o.b. cars dock Pacific ports | 2.975c. | 2.975c. | 3.625c. |
| Hot-rolled annealed sheets (No. 24) | 5.15c. | 5.05c. | 5.35c. |
| Hot-rolled sheets (No. 10) | 4.30c. | 4.50c. | 4.50c. |
| Galv. sheets (No. 24 and lighter) | 5.85c. | 5.55c. | 5.90c. |
| Galv. sheets (No. 22 and heavier) | 6.10c. | 5.70c. | 5.90c. |
| Cold-finished steel Rounds | 6.80c. | 6.85c. | 7.10c. |
| Squares and hexagons | 8.05c. | 8.10c. | 7.10c. |
| Flats | 8.55c. | 8.60c. | 8.10c. |
| Common wire nails—base per keg less carload | $3.65 | $3.60 | $3.70 |

All items subject to differentials for quantity.

## REFRACTORIES PRICES

### Fire Clay Brick

| | Per 1000 f.o.b. Works |
|---|---|
| First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | $54.00 |
| First quality, New Jersey | 56.00 |
| Select, Ohio | 49.00 |
| Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | 49.00 |
| Second quality, New Jersey | 51.00 |
| No. 1, Ohio | 46.00 |
| Ground fire clay, per ton | 8.00 |

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

### Silica Brick

| | Per 1000 f.o.b. Works |
|---|---|
| Pennsylvania | $54.00 |
| Chicago District | 63.00 |
| Birmingham | 54.00 |
| Silica cement per net ton (Eastern) | 9.50 |

5 per cent trade discount on silica brick.

### Chrome Brick

| | Per Net Ton |
|---|---|
| Standard f.o.b. Baltimore, Plymouth Meeting and Chester | $49.00 |
| Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. | 49.00 |

### Magnesite Brick

| | Per Net Ton |
|---|---|
| Standard f.o.b. Baltimore and Chester | $69.00 |
| Chemically bonded, f.o.b. Baltimore | 59.00 |

### Grain Magnesite

| | Per Net Ton |
|---|---|
| Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) | $45.00 |
| Domestic, f.o.b. Baltimore and Chester, in sacks | 43.00 |
| Domestic, f.o.b. Chewelah, Wash. | 25.00 |

# RAW MATERIALS PRICES

## PIG IRON

**No. 2 Foundry**

| | |
|---|---|
| F.o.b. Everett, Mass. | $25.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md. | 25.00 |
| Delivered Brooklyn | 27.27 |
| Delivered Newark or Jersey City | 26.39 |
| Delivered Philadelphia | 25.76 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. | 24.00 |
| F.o.b. Jackson, Ohio | 25.75 |
| Delivered Cincinnati | 24.07 |
| F.o.b. Duluth | 24.50 |
| F.o.b. Provo, Utah | 22.00 |
| Delivered San Francisco, Los Angeles or Seattle | $26.50 |
| F.o.b. Birmingham* | 20.38 |

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

**Malleable**

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

**Basic**

| | |
|---|---|
| Fo.b. Everett, Mass. | $25.75 |
| F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md. | 24.50 |
| F.o.b. Buffalo | 23.00 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. | 23.50 |
| Delivered Cincinnati | 24.51 |
| Delivered Canton, Ohio | 24.76 |
| Delivered Mansfield, Ohio | 25.26 |
| F.o.b. Jackson, Ohio | 25.50 |
| F.o.b. Birmingham | 19.00 |

**Bessemer**

| | |
|---|---|
| F.o.b. Everett, Mass. | $26.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa. | 26.00 |
| Delivered Boston Switching District | 26.50 |
| Delivered Newark or Jersey City | 27.39 |
| Delivered Philadelphia | 26.76 |
| F.o.b. Buffalo and Erie, Pa., and Duluth | 25.00 |
| F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago | 24.50 |
| F.o.b. Birmingham | 25.00 |
| Delivered Cincinnati | 25.51 |
| Delivered Canton, Ohio | 25.76 |
| Delivered Mansfield, Ohio | 26.26 |

**Low Phosphorus**

| | |
|---|---|
| Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. | $28.50 |

**Gray Forge**

| | |
|---|---|
| Valley or Pittsburgh furnace | $23.50 |

**Charcoal**

| | |
|---|---|
| Lake Superior furnace | $27.00 |
| Delivered Chicago | 30.04 |

**Canadian Pig Iron**

*Per Gross Ton*

Delivered Toronto

| | |
|---|---|
| No. 1 fdy., sil. 2.25 to 2.75 | $26.50 |
| No. 2 fdy., sil. 1.75 to 2.25 | 25.50 |
| Malleable | 26.00 |
| Basic | 25.50 |

Delivered Montreal

| | |
|---|---|
| No. 1 fdy., sil. 2.25 to 2.75 | $27.50 |
| No. 2 fdy., sil. 1.75 to 2.25 | 27.06 |
| Malleable | 27.50 |
| Basic | 27.00 |

## FERROALLOYS

**Ferromanganese**

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

*Per Gross Ton*

| | |
|---|---|
| Domestic, 80% (carload) | $102.50 |

**Spiegeleisen**

*Per Gross Ton Furnace*

| | |
|---|---|
| Domestic, 19 to 21% | $33.00 |
| F.o.b. New Orleans | 33.00 |

**Electric Ferrosilicon**

*Per Gross Ton Delivered*

| | |
|---|---|
| 50% (carloads) | $69.50 |
| 50% (ton lots) | 77.00 |
| 75% (carloads) | 126.00 |
| 75% (ton lots) | 136.00 |

**Silvery Iron**

*Per Gross Ton*

| | |
|---|---|
| F.o.b. Jackson, Ohio, 5.00 to 5.50% | $27.50 |

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

**Bessemer Ferrosilicon**

*F.o.b. Jackson, Ohio, Furnace*

*Per Gross Ton*

| | |
|---|---|
| 10.00 to 10.50% | $33.50 |
| 10.51 to 11.00% | 34.00 |
| 11.01 to 11.50% | 34.50 |
| 11.51 to 12.00% | 35.00 |
| 12.01 to 12.50% | 35.50 |
| 12.51 to 13.00% | 36.00 |
| 13.01 to 13.50% | 36.50 |
| 13.51 to 14.00% | 37.00 |
| 14.01 to 14.50% | 37.50 |
| 14.51 to 15.00% | 38.00 |
| 15.01 to 15.50% | 38.50 |
| 15.51 to 16.00% | 39.00 |
| 16.01 to 16.50% | 39.50 |
| 16.51 to 17.00% | 40.00 |

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

**Other Ferroalloys**

| | |
|---|---|
| Ferrotungsten, per lb. contained W del., carloads, nominally | $1.80 |
| Ferrotungsten, lots of 5000 lbs., nominally | 1.85 |
| Ferrotungsten, smaller lots, nominally | 1.90 |
| Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract | 10.50c.* |
| Ferrochromium, 2% carbon | 16.50c. to 17.00c.* |
| Ferrochromium, 1% carbon | 17.50c. to 18.00c.* |
| Ferrochromium, 0.10% carbon | 19.50c. to 20.00c.* |
| Ferrochromium, 0.06% carbon | 20.00c. to 20.50c.* |
| Ferrovanadium, del. per lb. contained V. | $2.70 to $2.90 |
| Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y. | $2.50* |
| Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton | $142.50 |
| Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton | $157.50 |
| Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton | 63.50 |
| Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn. | 80.00 |
| Ferromolybdenum, per lb. Mo del. | 95c. |
| Calcium molybdate, per lb. Mo del. | 80c. |
| Silico spiegel, per ton, f.o.b. furnace, carloads | $45.00 |
| Ton lots or less, per ton | 50.00 |
| Silico-manganese, gross ton, delivered. | |
| 3% | 101.50 |
| 2.50% carbon grade | 106.50 |
| 2% carbon grade | 111.50 |
| 1% carbon grade | 121.50 |

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

## ORES

**Lake Superior Ores**

*Delivered Lower Lake Ports*

*Per Gross Ton*

| | |
|---|---|
| Old range, Bessemer, 51.50% | $5.25 |
| Old range, non-Bessemer, 51.50% | 5.10 |
| Mesabi, Bessemer, 51.50% | 5.10 |
| Mesabi, non-Bessemer, 51.50% | $4.95 |
| High phosphorus, 51.50% | 4.85 |

**Foreign Ore**

*C.i.f. Philadelphia or Baltimore*

*Per Unit*

| | |
|---|---|
| Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal | 17.00c. |
| Iron, low phos., Swedish, average, 68½% iron | Nominal |
| Iron, basic or foundry, Swedish, aver. 65% iron | Nominal |
| Iron, basic or foundry, Russian, aver. 65% iron | Nominal |
| Man., Caucasian, washed 52% | 52c. |
| Man., African, Indian, 44-48% | Nominal |
| Man., African, Indian, 49-51% | Nominal |
| Man., Brazilian, 46 to 48½% | Nominal |

*Per Net Ton Unit*

| | |
|---|---|
| Tungsten, Chinese, wolframite, duty paid, delivered, nominal | $28.00 to $30.00 |
| Tungsten, domestic, scheelite delivered, nominally | $25.00 to $29.00 |
| Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: | |
| South African (low grade) | $16.00 |
| Rhodesian, 45% | 23.00 |
| Rhodesian, 48% | 26.75 |
| Turkish, 48-49% | 25.50 to $26.50 |
| Turkish, 45-46% | 23.50 to 24.00 |
| Turkish, 44% | 19.00 to 19.50 |
| Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: | |
| 50% | $25.50 to $26.50 |
| 48-49% | 24.50 to 25.00 |

## FLUORSPAR

*Per Net Ton*

| | |
|---|---|
| Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail | $20.00 |
| Domestic, barge and rail | 22.00 |
| No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines | $22.00 to 23.00 |
| Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid | 24.50 |
| Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | 35.00 |

## FUEL OIL

*Per Gal.*

| | |
|---|---|
| F.o.b. Bayonne or Baltimore, No. 3 distillate | 5.25c. |
| F.o.b. Bayonne or Baltimore, No. 4 industrial | 5.25c. |
| Del'd Ch'go, No. 3 industrial | 4.15c. |
| Del'd Ch'go, No. 5 industrial | 4.00c. |
| Del'd Cleve'd, No. 3 distillate | 5.75c. |
| Del'd Cleve'd No. 4 industrial | 5.75c. |
| Del'd Cleve'd No. 5 industrial | 5.00c. |

## COKE AND COAL

| Coke | *Per Net Ton* |
|---|---|
| Furnace, f.o.b. Connellsville, Prompt | $4.25 to $4.50 |
| Foundry, f.o.b. Connellsville, Prompt | 5.00 to 6.25 |
| Foundry, by-product, Chicago ovens | 10.25 |
| Foundry, by-product, del'd New England | 12.50 |
| Foundry, by-product, del'd Newark or Jersey City | 10.85 to 11.30 |
| Foundry, by-product, Philadelphia | 10.60 |
| Foundry, by-product, delivered Cleveland | 11.00 |
| Foundry, by-product, delivered Cincinnati | 10.50 |
| Foundry, Birmingham | 7.50 |
| Foundry, by-product, del'd St. Louis industrial district | 11.00 to 11.50 |
| Foundry, from Birmingham, f.o.b. cars docks, Pacific ports | 14.75 |

| Coal | *Per Net Ton* |
|---|---|
| Mine run steam coal, f.o.b. W. Pa. mines | $1.50 to $1.75 |
| Mine run coking coal, f.o.b. W. Pa. | 1.75 to 1.90 |
| Gas coal, ¾-in. f.o.b. Pa. mines | 2.00 to 2.25 |
| Mine run gas coal, f.o.b. Pa. mines | 1.80 to 2.00 |
| Steam slack, f.o.b. W. Pa. mines | 1.00 to 1.25 |
| Gas slack, f.o.b. W. Pa. mines | 1.20 to 1.45 |

# Priorities May Rule in Britain On Steel For Rearmament

LONDON (*Special Correspondence*).—Further interference with the iron and steel industry, due to widespread rearmament activity, is foreshadowed by the Earl of Dudley, past president of the British Iron and Steel Federation. Lord Dudley says it is almost certain that the British Government will insist that work coming within the scope of the rearmament program be given priority over other orders.

He admits that no such regulation has yet been made, owing to the desire of the Government not to interfere with the ordinary trade of the country, but says there is no doubt that, indirectly at least, rearmament work is already interfering to a marked extent with "honest trade."

For example, shipbuilding prices are now around 75 per cent higher than they were a year ago, reflecting a rise of 60 per cent in steel, while it is not possible to obtain delivery of new tramp ships and tankers under 18 months, compared with around six months before the shipyards became congested with naval work.

Today shipowners have not only ceased ordering new tonnage, but a number of them contemplate selling their existing fleets at present high prices. One such transaction, involving the sail of three tramp steamers, was recently concluded at a high profit.

Rearmament demands are also making themselves felt in the supply of new equipment. Bigger ingot molds than have ever been used previously have recently been supplied from the foundries of the Brightside Foundry & Engineering Co. Their delivery permits the casting of huge ingots needed for armament work. Deliveries of similar big ingot molds have recently been made to the works of Thomas Firth and John Brown, Ltd., where there is a large amount of rearmament work in course of execution.

The Vickers' works of the English Steel Corp. has just cast one of the biggest steel ingots ever made in Britain, weighing about 258 tons.

# Japanese and Chinese Traders Buy Jointly in Europe Though at War

HAMBURG (*Special Correspondence*).—Japan has ordered about 10,000 tons of various steel products with extra prices for quick delivery from Luxemburg and Germany. More than 70 per cent is destined for armament and ammunition manufacture.

It is now learned from German steel exporters and other sources that Japan had bought before the outbreak of hostilities all important stocks of steel in Chinese and Hong Kong warehouses. China's steel industry is dependent upon supplies of raw materials from abroad, the production of the Hankow works being very small. As the Chinese armament industry is unable to get supplies from abroad, except scanty quantities, and stocks of raw materials are very small, the great consumption of ammunition in the present war must result very soon in an exhaustion of supplies. This is a greater danger to China than the military actions.

Shipments of steel, which had been partially unloaded at Hong Kong, have been resumed to Shanghai, where large quantities are in demand, although a further shipment to the interior is next to impossible. It is also learned that Chinese steel importers are demanding up to 50 per cent extra over current market prices if they supply steel to the interior in small quantities.

The large orders China has placed in Czecho-Slovakia, Belgium and Switzerland for armaments, trucks, etc., will not be executed, as the suppliers demand that delivery should take place f.o.b. European ports and payment before delivery, which the Chinese Government has refused to accept. Therefore execution of all orders is suspended. Something which is impossible to understand is: China pays the Boxer indemnities still to Japan, Chinese and Japanese buyers close together in Hamburg and London and buy on joint account "in order not to spoil prices" (for example a Chinese and Japanese commission bought together, supporting one another, large quantities of various materials in Switzerland and Denmark); Chinese dealers cable orders that the goods should be shipped on Japanese ships, as they more safely and punctually arrive at Shanghai. Dozens of such cases are daily reported at the European trading centers.

The international scrap cartel, expiring Dec. 31, will be extended by a period of six months.

# Coming Conventions

Oct. 8 to 9—American Foundrymen's Association, St. Louis chapter regional conference, Missouri School of Mines, Rolla, Mo. J. W. Kelln, 4041 Park Avenue, St. Louis, secretary.

Oct. 11 to 12—Porcelain Enamel Institute, seventh annual meeting, Chicago, to be followed by the annual forum at Ohio State University, Columbus, Ohio. R. G. Calton, 612 North Michigan Avenue, Chicago, president.

Oct. 11 to 12—Associated Machine Tool Dealers, French Lick Springs Hotel, French Lick, Ind. Thomas A. Fernley, Jr., 505 Arch Street, Philadelphia, executive secretary.

Oct. 11 to 15—National Safety Congress and Exposition, Kansas City municipal auditorium. Headquarters of National Safety Council is at 20 North Wacker Drive, Chicago.

Oct. 14 to 16—Electrochemical Society, Inc., 72nd general meeting, St. Louis. Dr. C. G. Fink, Columbia University, New York, secretary.

Oct. 18 to 19—Foundry Equipment Manufacturers' Association, Greenbrier Hotel, White Sulphur Springs, W. Va. A. J. Tuscany, Penton Bldg., Cleveland, executive secretary.

Oct. 18 to 19—Steel Founders Society, Hot Springs, Va. R. L. Collier, 920 Midland Bldg., Cleveland, secretary.

Oct. 18 to 22—National Metal Congress, held under the auspices of American Society for Metals, American Welding Society, Iron and Steel and Institute of Metals Divisions, A.I.M.E., Iron and Steel and Machine Shop Practice Divisions, A.S.M.E., Atlantic City Auditorium, Atlantic City, N. J. Information may be secured from W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary, A.S.M.

Oct. 19 to 21—Manufacturers' Products Exhibit, Lord Baltimore Hotel, Baltimore. Exhibit is sponsored by Purchasing Agents Association of Baltimore, under the direction of Frank H. Carter, 220 East Pleasant Street, Baltimore.

# THIS WEEK'S MACHINE TOOL ACTIVITIES

***. . . Orders for single machines from a wide diversity of sources characterize present demand, being maintained at a satisfactory level.***

o o o

***. . . Some pickup noted the first of the month, as September volume approximates that of August.***

o o o

***. . . Small tool sales disappointing at Detroit.***

## *Chicago*

ORDERS for a wide variety of tools are being received steadily from a diversified number of industries. Sellers anticipate a steady, gradual rise in demand through the fall, but do not look for a boom period either now or next year. It is believed here that the main factor which will prevent a boom is the knowledge of industry that such times encourage labor troubles, and that, accordingly, large enterprises will attempt to check any such tendency, and try to confine business to a more narrow range. Large inquiries are few, although interest is constantly being expressed in small lots and single tools.

## *Cleveland*

MACHINE tool sales continue light and are confined to single machines. Not much new inquiry is coming out. The Hoover Co., North Canton, Ohio, has taken quotations on a number of machines for equipping a recently built plant addition, but it is uncertain when this equipment will be placed. While there is nothing at present to indicate a better volume of business this month than in September, dealers feel that activity will improve during the month.

Foreign inquiry continues plentiful, but no sales of machines in lots of any size were reported during the week.

## *Pittsburgh*

TOTAL machine tool sales in September were in excess of August business, in some cases showing increases ranging from 17 to 20 per cent. New business during the first few days of October has come in at a faster rate than early September. Several orders ready to be placed have been held up because of the present wave of "caution." Meanwhile, inquiries show no perceptible change from the past few weeks. Machine tool deliveries have improved somewhat, but a number of plants are still quoting quite extended shipments. Roughly, the average improvement in deliveries over the past month or two is estimated at about 30 days.

## *Detroit*

CONDITIONS at the start of the year's last quarter are extremely spotty for machine tool dealers in this area. While a number of the expansion programs discussed earlier are in their wind-up stage, it appears that only odds and ends will be purchased for the next few weeks, and no large new programs are in the wind at present. Disappointment is expressed by manufacturers and sellers of small tools because the automotive industry is not now at the part of the cycle they had anticipated. Ordinarily, with production getting under way on models not greatly changed from previous years, there would be comparatively heavy retooling programs under way, with anticipation of still more buying as production is speeded up at Show time. To date only a nominal activity has been apparent.

## *New York*

THERE was a pickup in both orders and inquiries the latter part of September, bringing the volume of new business in that month close up to the August volume. Activity in the earlier part of the month had been on a lower plane. For one dealer, the month proved to be the best this year, and several factory representatives more than made their quota. There has been a noticeable pickup in inquiries, a fact that presages a good fourth quarter. Although some commitments have been held up by financially minded boards, shop executives are exhibiting no hesitancy in proceeding with plans for further machinery purchases. Some equipment is being lined up for purchase in 1938.

A healthy factor in the present situation is the widely scattered sources from which orders are coming. No large lists have been issued in recent months, but the volume of single orders is substantial. Small shops as well as nationally known firms are among the buyers. Railroad activity continues light, although the New Haven bought a radial drill last week, and further inquiries have been forthcoming from the New York Central. The American Locomotive Co. is actively in the market once more.

Small tool sales have shown a substantial pick-up over the summer months.

## *Cincinnati*

MACHINERY demand in this area moved upward slightly the past week under stimulus of increased interest in lathes, cutter grinders, millers and drills. In fact, the rise in the closing weeks of September brought the month's total above that of August and neared the trade's expectations for the early fall. Scattered automotive purchasing brought comment from the trade of anticipated further retooling in this field. Orders were chiefly from domestic sources. Multiple unit ordering is almost absent from the market, current business being in single tool quantities. Inquiry is encouraging, although some quotations pending for some time have been marked doubtful.

Plant operations are unchanged. All factories are running near to capacity with some night shifts.

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## RAILROAD BUYING

**Pennsylvania** has placed an order for one diesel-electric locomotive with Electro-Motive Corp.

**Westinghouse Air Brake Co.** is inquiring for one switching locomotive.

**Atchison, Topeka & Santa Fe** is inquiring for 37 passenger cars.

**Wabash Railway** has been authorized to install Evans automobile loading device on 100 cars at a cost of $32,310.

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## Bethlehem Bonds Offered to Public

A TOTAL of $43,003,300 of 3½ per cent convertible debentures, intended to pay off $10,000,000 in promissory notes and provide additional working capital, is being offered for Bethlehem Steel Corp. by a banking group, including Kuhn, Loeb & Co., Brown, Harriman & Co., G. M-P Murphy & Co. and the Mellon Securities Co. According to an amendment filed with the Securities and Exchange Commission, $1,996,700 of the original bond issue was subscribed for by common shareholders whose right to buy the debentures expired Oct. 1.

# PLANT EXPANSION AND EQUIPMENT BUYING

## NORTH ATLANTIC

**National Lead Co.**, 111 Broadway, New York, will take bids soon for new metal-reclaiming and smelting plant on four-acre tract on Trinity River, Dallas, Tex., comprising furnace units, one and multi-story production shops, storage and distributing buildings and other structures. Cost close to $500,000 with equipment. J. A. Caselton, company office, 722 Chestnut Street, St. Louis, is in charge.

**Signal Corps Procurement District**, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Oct. 25 for 76,530 ft. of cable and 76 reels (Circular 37).

**Freeport Sulphur Co.**, 122 East Forty-second Street, New York, has authorized expansion at mining properties at Port Sulphur, La., comprising new buildings, mining equipment, storage and distribution facilities, loading and other mechanical-handling equipment. Cost about $300,000.

**Canada Dry Ginger Ale, Inc.**, 100 East Forty-second Street, New York, has plans for one-story and basement mechanical-bottling plant at Omaha, Neb. Cost close to $100,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Oct. 12 for 31 testing generators for Brooklyn and Mare Island Navy yards (Schedule 1767).

**Prest-O-Lite Co., Inc.**, 30 East Forty-second Street, New York, manufacturer of cylinders for compressed and liquefied gases, etc., has let general contract to Fred T. Ley Co., Inc., 1215 Main Street, Springfield, Mass., for one-story addition to plant at 309 Pasco Road, Springfield. Cost close to $30,000 with equipment.

**American Safety Razor Corp.**, 315 Jay Street, Brooklyn, has filed plans for alterations and improvements in one, two and eight-story plant and one-story boiler house. Cost over $45,000.

**Quartermaster Supply Office**, Brooklyn, asks bids until Oct. 22 for 10,000 lb. of wire nails (Proposal 626-66).

**United States Rubber Products, Inc.**, 1 Market Street, Passaic, N. J., has let general contract to H. V. Collins Construction Co., 4 Westminster Street, Providence, R. I., for one-story and basement addition, 80 x 180 ft., to branch plant at Providence, primarily for storage and distribution. Cost close to $45,000 with equipment.

**Commanding Officer**, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Oct. 11 for 16,000 thumb nuts, malleable iron or steel castings (Circular 222), 5000 lb. of steel grit (Circular 224); until Oct. 22, for reworking 31,700 lb. of brass turnings into brass rods (Circular 210), 4000 galvanized steel carriage bolts (Circular 216); until Oct. 25, 40,000 fuze well cups (Circular 220).

**Thermoid Rubber Co.**, Whitehead Road, Trenton, N. J., manufacturer of mechanical rubber goods, has let general contract to William T. Wright Co., Ltd., 101 North Broad Street, for one-story addition, 100 x 300 ft., for storage and distribution. Cost over $60,000 with equipment. P. L. Fowler Co., 224 East Hanover Street, are architects.

**Durham Duplex Razor Co.**, 190 Baldwin Avenue, Jersey City, N. J., has acquired for branch plant, former mill of Southern Textile Corp. at Mystic, Conn., totaling about 22,000 sq. ft. of floor space.

**Ferodo & Asbestos, Inc.**, Codwise Avenue, New Brunswick, N. J., manufacturer of brake-lining, asbestos-cement products, etc., has let general contract to Austin Co., Cleveland, for one and two-story addition, 90 x 500 ft. Cost about $350,000 with equipment. Company is a subsidiary of Keasbey & Mattison Co., Ambler, Pa.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Oct. 15 for two portable boring bars, 4½-in. dia. and 8 ft. long, for Philadelphia Navy Yard (Schedule 1807).

**Commanding Officer**, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Oct. 11 for one die machine with double-roller feeding attachment, scrap cutter, automatically-controlled stock straightener and accessories (Circular 278); until Oct. 21, one horizontal two-spindle, semi-automatic drilling machine with equipment (Circular 245), nine routing machines, with tools (Circular 284), and dynamic regulating mechanisms and frequency converter unit (Circular 285).

**Pennsylvania Electric Steel Castings Co.**, Hamburg, Pa., plans rebuilding part of plant recently destroyed by fire. Loss over $75,000 with equipment.

## BUFFALO DISTRICT

**Crane Co.**, 201 Church Street, Buffalo, manufacturer of valves, fittings, plumbing equipment, etc., has plans for one-story addition and improvements in present plant. Cost close to $45,000 with equipment. Frederick C. Backus, 360 Delaware Avenue, is architect. Company headquarters are at Chicago.

**United States Engineer Office**, Federal Building, Buffalo, asks bids until Oct. 12 for galvanized malleable pipe straps, rigid steel conduit, conduit hangers, conduit lock-nuts, galvanized malleable conduit unions, rubber-covered wire, etc. (Circular 40), 850 lb. welding electrodes (Circular 43).

## WASHINGTON DIST.

**Purchasing and Contracting Officer**, Holabird Quartermaster Depot, Baltimore, asks bids until Oct. 22 for 300 10-gal. steel drums for oil and gasoline, 400 7½-gal., and 600 5-gal. steel drums (Circular 398-21).

**C. O. Wertzberger & Sons Co.**, Mount Winans, Md., manufacturer of machinery and parts, plans rebuilding one-story machine shop recently destroyed by fire. Loss close to $60,000 with equipment.

**General Purchasing Officer**, Panama Canal, Washington, asks bids until Oct. 15 for steel cap screws, machine screws, machine screw nuts, wood screws, brass plate washers, 1000 lb. of copper tacks, 25,500 ft. of coil chain, one gasoline engine-driven single diaphragm pump, two wheel and gear pullers, wrought iron pipe, telephone cable, conduit elbows, eight distribution type transformers and other equipment (Schedule 3291).

**Board of District Commissioners**, District Building, Washington, asks bids on general contract until Oct. 15 for new three-story Dennison vocational school at 1300 Allison Street, N.W. Cost about $320,000 with equipment. Nathan C. Wyeth, address noted, is municipal architect in charge.

**Division of Purchases and Sales**, Department of Commerce, Washington, asks bids until Oct. 15 for 14 to 22 full automatic engine-generator sets, each 1½-kva., with accessories (Proposal 28812).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Oct. 12 for air hose fittings (Schedule 1757) for Washington, Norfolk and Puget Sound Navy yards; 100 electric tachometers (Schedule 1768) for Philadelphia yard; turbine and motor-driven pumping units and spare parts (Schedule 1646), copper ribbon and copper resistance wire (Schedule 1717), 38,000 flashlights (Schedule 1715) for Eastern and Western yards; ball bearings (Schedule 1761) for Newport, R. I., Naval Station; until Oct. 15, 90,000 practice bombs (Schedule 1784), 90,000 signals, miniature practice bombs (Schedule 1779) for Portsmouth, N. H., and Mare Island Navy yards.

## NEW ENGLAND

**Wire Rope Corp. of America, Inc.**, Commerce Street, New Haven, Conn., has plans for a one-story addition, 90 x 145 ft. Cost over $45,000 with equipment. Leo F. Caproni, 1221 Chapel Street, is architect and engineer.

**Dehydrating Process Co.**, 6 Mount Washington Avenue, South Boston, has plans for steam power house, 41 x 56 ft. Cost close to $40,000 with equipment. Thomas McSweeney, 77 Summer Street, Boston, is consulting engineer.

**Remington Arms Co.**, Barnum Avenue, Bridgeport, Conn., has let general contract to Edwin Moss & Sons, 555 Grant Street, for one-story addition, 95 x 210 ft. Cost close to $75,000 with equipment.

**A. J. Donahue**, Factory Lane, Milford, Conn., operating a machine works, has let general contract to Bristol Building Co., Bristol, Conn., for one-story machine shop, 25 x 100 ft. Cost close to $30,000 with equipment.

**New Britain Machine Co.**, Costello Street, New Britain, Conn., manufacturer of automatic screw machines and parts, wood-working machinery, etc., has arranged for stock issue of about $375,000, part of fund to be used for expansion, including equipment.

**United States Stamp Metal Co.**, 9 Hunt Street, Worcester, Mass., has taken out permit for one-story addition, 51 x 101 ft. Plans are private.

## SOUTH ATLANTIC

**Standard Oil Co.**, Pensacola, Fla., has plans for new bulk oil storage and distributing plant at foot of Barcelona Street, including pumping station and steel tanks with capacity of 5,000,000 gal. Plant will be equipped for refueling vessels at port. Cost about $100,000 with equipment. William Leonard, Pensacola, is company representative in charge.

**Lamede, Inc.**, Chattanooga, Tenn., care of W. F. Lamoreaux, 48 South Crest Road, recently organized with capital of $100,000 by Mr. Lamoreaux and associates to manufacture industrial chemicals, has selected tract near Rossville, Ga., for plant, superstructure to begin soon. Cost over $50,000 with equipment.

**Swift & Co.**, 48 N.W. Eleventh Street, Miami, Fla., meat packers, have filed plans for one-story addition, 50 x 100 ft., and improvements in present plant. Cost close to $50,000 with equipment.

## SOUTHWEST

**Griesedieck Brothers Brewery Co.**, 1920 Shenandoah Street, St. Louis, has asked bids on general contract for two-story addition, in part for storage and distribution. Cost over $75,000 with equipment. Janssen & Janssen, Chemical building, are architects.

**Central Valley Electric Corp.**, Artesia, N. M., L. S. Reser, president, plans new steam-electric power plant for power supply for rural electrification system. Cost about $125,000 with equipment; electric distribution system will cost $135,000. Financing has been arranged through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

**Farley Machine Co.**, West Tenth Street, Great Bend, Kan., manufacturer of machinery and parts, has plans for one-story machine shop, 36 x 70 ft. Cost about $30,000 with equipment.

**Octane Oil & Refining Co.**, Longview, Tex., has acquired property at Cotton Valley, La., for new oil refinery, including steel tank storage division, pumping station, power house and other units. Cost over $600,000 with machinery.

**Schlumberger Oil Well Surveying Corp.**, Esperson Building, Houston, Tex., has plans for one-story machine shop, 70 x 125 ft., for equipment repairs and parts replacements. Cost close to $40,000 with equipment. Russell Brown Co., 3104 Main Street, is architect.

**Coca-Cola Bottling Co.**, Marshall, Tex., has asked bids on general contract for

one and two-story mechanical-bottling plant, 68 x 110 ft. Cost about $50,000 with equipment. Edwin F. Neild, City Bank Building, Shreveport, La., is architect.

## SOUTH CENTRAL

**National Gypsum Co.**, 190 Delaware Avenue, Buffalo, has let general contract to H. K. Ferguson Co., Cleveland, for new plant at Mobile, Ala., on tract near mouth of Mobile River, previously occupied by General Cable Corp., New York. Buildings will be modernized and additional units erected. Plant will manufacture line of building products, including insulated fiber board. Cost close to $1,500,000 with machinery.

**Director of Purchases**, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Oct. 14 for 400 miles of electric cable, resistance not exceeding 2.24 ohms per mile, and 200 miles of similar cable, resistance not exceeding 1.41 ohms per mile, for rural electrification.

**Coca-Cola Bottling Co.**, Opelika, Ala., will take bids soon for new two-story mechanical-bottling plant. Cost close to $50,000 with equipment. Francis P. Smith, Norris Building, Atlanta, Ga., is architect.

**United States Engineer Office**, Vicksburg, Miss., asks bids until Oct. 11 for steel castings, including drums, brackets, pinion shaft locks, pawls, pinions and gears (Circular 74).

## WESTERN PA. DIST.

**Quaker State Refining Co.**, Farmers Valley, Pa., has let structural steel contract to Keystone Engineering Co., Maloney Building, Pittsburgh, for two-story addition, 50 x 86 ft., primarily for storage and distribution. Cost close to $50,000 with equipment.

**Marmet Coal Co.**, Hernshaw, W. Va., plans new coal tipple on Kanawha River, near Marmet Locks. Cost about $50,000 with elevating, conveying and other mechanical-handling equipment.

**Pittsburgh & Lake Erie Railroad**, South Smithfield and Carson Streets, Pittsburgh, plans new steam power house at local yards. Cost over $45,000 with equipment. R. P. Forsberg is chief engineer.

## MICHIGAN DISTRICT

**Ford Motor Co.**, Dearborn, Mich., has plans for one-story press shop at River Rouge plant. Cost over $150,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer. Company also has approved plans for expansion in steel rolling mill at some works, including additional equipment. Architect and engineer noted, in charge.

**Briggs Mfg. Co.**, 11631 Mack Avenue, Detroit, steel automobile bodies, has let general contract to Hoffman Construction Co., Central Union Building, Evansville, Ind., for one-story addition, 100 x 200 ft., to branch plant at Evansville, primarily for storage and distribution. Cost over $60,000 with equipment.

**National Twist Drill & Tool Co.**, 6522 Brush Avenue, Detroit, has plans for one-story addition. Cost close to $35,000 with equipment. Richard H. Marr, 415 Brainard Street, is architect.

**Fruehauf Trailer Co.**, 10940 Harper Avenue, Detroit, motor trailers and parts, has plans for two one-story additions, totaling about 69,700 sq. ft. floor space, for general production and storage and distribution, respectively. Cost over $100,000 with equipment.

## OHIO AND INDIANA

**Ohio Electric Mfg. Co.**, 5900 Maurice Avenue, Cleveland, manufacturer of electric motors, magnets and kindred products. has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for two-story top addition to one-story building, 60 x 90 ft. Cost over $50,000 with equipment.

**Ohio Rubber Co.**, Willoughby, Ohio, manufacturer of molded rubber products, has awarded general contract to Gordon C. Rutland, Lost Nation Road, for three-story addition, 85 x 90 ft. Cost close to $70,000 with equipment.

**General Electric Co.**, Niles, Ohio, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, Cleveland, for one-story addition, to plant on West Federal Street. Cost about $85,000 with equipment.

**Mokry & Tesmer Machine Works**, 1811 Clayton Avenue, Middletown, Ohio, manufacturer of machinery and parts, has let general contract to B. D. Morgan, 224 Bellemonte Street, for one-story addition, 55 x 70 ft. Cost about $30,000 with equipment.

**Contracting Officer**, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Oct. 11 for three sand-blast units (Circular 259); until Oct. 13, 400 throttle lever assemblies and 70 engine control assemblies (Circular 241), 15 automatic supercharger-type regulator assemblies (Circular 242); until Oct. 14, eight block test scales (Circular 264); until Oct. 15, adapters, tail wheel axles, tail wheel spacers, chemical tank air inlet tubes, hub bushings, etc. (Circular 263), 12 power-operated lawn mowers (Circular 267); until Oct. 18, exhaust collector rings (Circular 265), six 5-ton power-operated rollers (Circular 268); until Oct. 19, 29 motor-driven drill presses (Circular 262); 23 electric-geared aircraft motors (Circular 269).

**Coca-Cola Bottling Works**, 357 North Main Street, Frankfort, Ind., has asked bids on general contract for two-story mechanical-bottling plant, 63 x 100 ft. Cost close to $50,000 with equipment. Rubush & Hunter, Architects' & Builders' Building, Indianapolis, are architects.

## MIDDLE WEST

**American Steel & Wire Co.**, 208 South LaSalle Street, Chicago, has approved plans for one-story addition to branch plant at Waukegan, Ill. Cost close to $65,000 with equipment.

**Swift & Co.**, Union Stock Yards, Chicago, plans early rebuilding of part of main building at local plant, recently destroyed by fire. Loss about $150,000 with equipment.

**Gold Seal Asphalt Roofing Co.**, Minneapolis, has let general contract to Blaw-Knox Co., Blawnox, Pittsburgh, for five one-story buildings for new plant unit at Chicago Heights, Ill. Cost over $80,000 with equipment.

**Bureau of Reclamation**, Denver, asks bids until Oct. 11 for one gasoline engine-generator set (Proposal 31370-A); until Oct. 15, two 25-kw. gasoline engine-generator sets (Proposal 42671-A).

**State Advisory Board**, State Capitol, Denver, has approved plans for one-story vocational shop, 45 x 205 ft., with main boiler house, at Colorado State Reformatory, Buena Vista. William N. Bowman Co., Insurance Building, Denver, is architect.

**Common Council**, Waverly, Iowa, asks bids until Oct. 19 for three diesel engine-generator units, combined capacity not less than 1575 hp., with accessories, switchgear, motor controls, transformers and auxiliary equipment for municipal electric power plant. Cost about $185,000. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

**United States Engineer Office**, Fort Peck, Mont., asks bids until Oct. 12 for machine screws, machine bolts, carriage bolts and cotter pins (Circular 112).

**E. I. du Pont de Nemours & Co.**, Wilmington, Del., has acquired former plant of Perfection Tire Co., Fort Madison, Iowa, and will modernize for branch plant for production of industrial varnishes, finishes, oils and kindred specialties. Additions will be built and facilities installed for employment of about 150 operatives. Cost over $100,000 with equipment.

**Arneson Foundry Co., Inc.**, 6412 Thirty-third Avenue, Kenosha, Wis., manufacturer of iron and steel castings, is forming affiliate to be directed by Thomas Arneson, Jr., to manufacture brass, Aluminum and copper castings in new foundry, 35 x 102 ft., under construction at 3417 Fourteenth Avenue, Kenosha.

**Koehring Co.**, 3026 West Concordia Avenue, Milwaukee, manufacturer of concrete mixers, paving machines, excavators, shovels, etc., has made appropriation of $75,000 for purchase of new production equipment over next six months to manufacture parts now supplied by specialty shops.

**Oilgear Co.**, 1403 West Bruce Street, Milwaukee, manufacturer of hydraulic machine tool transmissions, broaching machines, etc., has placed contracts for plant addition, costing about $35,000 with equipment, to house welding department, part of which now occupies leased quarters. Walter Ferris is chief engineer.

**Vilas Timber Products, Inc.**, Eagle River, Wis., has been organized by H. N. Smith and D. S. Long, of Watertown. Wis., and will build new saw and planing mill, dry kilns, etc., on site of old Wisconsin-Michigan Lumber Co. plant at Eagle River. Investment will be in excess of $150,000, including remodeling of old planing mill into general wood-working factory.

**H. Barkow Co.**, 153 North Milwaukee Street, Milwaukee, manufacturer of motor truck bodies, hoists, etc., has plans by R. H. Kloppenburg, architect, 708 East Green Tree Road, for factory addition, 38 x 60 ft., and general alterations in present plant, to cost $30,000.

**International Harvester Co.**, 1640 West Bruce Street, Milwaukee, has placed contracts for construction of gas compressor shop addition, 35 x 150 ft.

## PACIFIC COAST

**Sacramento Municipal Utility District**, Sacramento, Cal., plans three hydroelectric power projects on South Fork of American River and Silver Creek, Eldorado County, consisting of a power dam and generating station near Brush Creek, and power dams and hydroelectric stations at Big Bend and Chili Bar. Plants will be tied in with transmission line and high-tension lines will be built to Sacramento and neighboring points. Cost over $6,000,000.

**Standard Oil Co. of California, Inc.**, 225 Bush Street, San Francisco, plans rebuilding part of local bulk oil storage and distributing plant recently destroyed by fire. Loss close to $250,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Oct. 22 for parts for airplanes (Schedules 900-1135 and 900-1139), for San Diego Naval Air Station.

**Puget Sound Pulp & Timber Co.**, Bellingham, Wash., has let general contract to Howard S. Wright & Co., 2210 Second Street, Seattle, for additions to unbleached sulphite pulp mill, including main unit, 80 x 400 ft., power substation, steam power house, screen building and other structures. Cost about $2,600,000 with equipment.

**Huntington Beach Union High School District**, Huntington Beach, Cal., has asked bids on general contract for one-story industrial arts building, 101 x 146 ft. Cost about $85,000 exclusive of equipment. Allison & Allison, Edison Building, Los Angeles, are architects.

**Pacific Distilleries, Inc.**, Culver City, Cal., has approved plans for one-story addition. Cost close to $25,000 with equipment. Arlos R. Sedgley, 910 North Serrano Avenue, Los Angeles, is architect.

## FOREIGN

**Samuel Fox & Co., Ltd.**, Stocksbridge, near Sheffield, England, manufacturer of steel products, plans one-story addition for production of steel springs for automobiles and vehicles, and one-story rolling mill for stainless steel sheet production. Cost over $1,500,000 with equipment.

**Phillips Lamp Co., Ltd.**, Blackbourn, England, manufacturer of electric lamps and kindred products, has plans for new works on 30 acre tract, comprising main one and multi-story building with smaller structures. Cost close to $500,000 with equipment.

**Walker Metal Products Co.**, 1511 Kildare Road, Windsor, Ont., has let general contract to Hein Construction Co., 172 Aylmer Avenue, for one-story foundry, 35 x 85 ft. Cost over $35,000.

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Provision is being made for installation of six large hydroelectric units, largest propeller type hydraulic turbines in the United States, in the TVA's Tennessee River power and flood control project. The first two units, to be set up at the Pickwick Landing Dam, are being constructed in the Allis-Chalmers Mfg. Co.'s Milwaukee plant. These turbines will have a nominal rating of 48,000 hp. under 43 ft. head and will develop 63,000 hp. if allowed to operate at full gate opening.

# What Is the Machine Doing For Your Community?

(CONTINUED FROM PAGE 54)

addicted to work. All of us have sufficient of the old Adam in us to be able to appreciate or imagine the luxury of being able to recline under a tree and merely reach up into its branches for our meals. But Eve had the bump of curiosity which has since formed the background and inspiration of research and experiment. She was not contented with the status quo and as a result of her experiment with the forbidden apple, Adam lost his meal ticket in the WPA of that day. Those letters do not mean today what they did then although there is a similarity between the two organizations. The WPA of Adam's time was the Workless Paradise Association.

Ever since that first great economic experiment of Eve's we have had to earn our bread by the sweat of our brow in an industrial economy. Of late years we have decreased the amount of perspiration, somewhat due to the help of the machine. But in Adam's day there was no machine.

The Garden of Eden was a community, just as is Ellwood city a community, although there are probably points of difference between the two. As a community, the Garden of Eden reflected the character of its inhabitants, including the snake, just as the community in your own valley reflects the good and the evil in the characters of those composing its members. The Garden of Eden, or its immediate environs to which Adam and Eve were banished, lacked many of the conveniences which you have here in your own community. It did not have alarm clocks—if you can call them conveniences rather than nuisances—bath tubs, radios, or furniture on the installment plan. That brings up the conditions to which I referred a few minutes ago which must be present before character and potential abilities of the members of the community can find fulfillment in the accomplishment of satisfactory material attainments.

The first big condition which must be present for this is profitable employment opportunity.

The second is the existence of reasonable individual freedom.

Perhaps I can best illustrate these points by telling you of a community which I recently visited. It was an exceptional community, for its members had attained 100 per cent social security. Every one was fully employed, with a guarantee of annual employment at fixed wages, not merely from day to day. Every member of this community was assured, no matter what happened in the stock market, or in foreign nations, that his standard of living would be unchanged and his three square meals and adequate shelter forthcoming.

Every member of this community knew that in case of sickness he would be hospitalized without expense, and given free medical or surgical service.

I asked one of the busy members of this community whether or not he was happy under this ideal arrangement of social conditions about which we hear such eloquent advocacy today. He said he was not. I asked him how much he made in the way of wages and he said 6c. a day. So I asked "what kind of a community can this be?" and he replied, "it is a State prison for life term convicts."

So you see, my friends, why just employment and social security are not enough to make a successful and happy community. You must have, as I said, a profitable working opportunity plus that degree of personal liberty which is prized as the inheritance of all free Americans.

Now, the point I am going to try to make is that the machine by and large has been the greatest instrumentality that we have had for the creation of profitable working opportunities as well as for the creation of individual liberty of action.

Here, again, permit me to take you not way back to the Garden of Eden but back to the dawn of recorded civilized history and to do that I will need the assistance of some 58 gentlemen, whom I will now introduce to you.

These fifty-eight assistants, whom, with the aid of your imagination I now place in a row upon this platform, are all octogenarians. They have each lived to be eighty-five years old.

There is nothing rare about an octogenarian, even though you seldom see 58 of them in a row at a meeting. There are 4000 of them in the State of Pennsylvania alone. But these octogenarians are different. Their life spans run consecutively; not concurrently. Only one of them, the old gentleman at the left end of the row that you see before you is alive today. He was born in 1850, the same year that number two, who stands alongside of him, passed along to a better world. In that year their life paths crossed, even though that year was the beginning of the one career and the end of the other. The octogenarian of 1850, in fact, might have rocked the cradle of the octogenarian of today.

And so on down the line of my 58 assistants, each an old man when his successor was born. Consecutive links, these, in a chain of life spans stretching down the supposedly long road of history.

But is it a long road? Let me ask these gentlemen some questions. I will begin with the man on the extreme left. Number 58, what have you seen?

He replies—"I saw the building of the first pyramid at Gizeh in the days of the Pharoahs, 3000 B.C."

Think of it, ladies and gentlemen. The last link in our life chain of fifty-eight octogenarians reaches back to the dawn of recorded history, to the dim, distant days when legend and actuality are inextricably interwoven in the heart of our first hieroglyphics.

And now, number 35 of you octogenarians, tell us what stands as the high point of your lifetime.

He replies—"I was chief artificer for King Solomon when he built the temple."

Number 23, what have you seen?

"I saw the crucifixion of Christ on Mount Calvary."

Twenty-three lifetimes of not uncommon length, ladies and gentlemen, span the entirety of the Christian era, from its beginning to the present day.

What tales these fifty eight old gentlemen could tell us tonight and for a thousand nights to come, had we but time to hear them. Among

their contemporaries were the discoverer of iron, the originator of the wheel, the inventor of the wedge and the lever, the first manipulator of the plow. What light they could throw upon the age-long inherent urge of mankind to increase his strength and stature by grasping the helping hand of mechanization during the long march down the road of time.

But we haven't time for that tonight. So I will pass to the sixth man from the present day, living octogenarian who stands at the right end of the line. Tell us of your times, number six.

And he replies—"I saw Columbus board the Santa Maria at Genoa when he sailed to discover a new continent."

Six of these life spans, ladies and gentlemen, more than measure our history of the new world.

And now, number two, let me ask you what happened in your day.

He replies—"As a youth of 23, I was clerk at the convention at Philadelphia which produced what Gladstone termed 'the greatest work ever produced at one time by the mind and purpose of man.' He referred to the Constitution of the United States of America.

The life spans of two octogenarians, ladies and gentlemen, measure the complete history of the United States, to date.

And now I come to the old gentleman who is at the right end of our line and who is present in the flesh as well as the spirit. Tell us, sir, the most impressive happening of your time.

And he replies—"I have witnessed the coming of the machine age, as we call it, and most of it has come during the latter half of my single lifetime. Electric power was unknown until I was 40 years of age; the automobile came when I was 50; mankind grew wings when I was 60. Even such commonplace things as sewing machines or fountain pens or typewriters were unknown in my youth and as a child, I crossed this continent in an ox-drawn covered wagon."

Mark you, friends of Ellwood City. One half of a living octogenarian's life span measures practically the entirety of what we mistakenly call the machine age. More material progress in science and invention and the arts of production have been made in that half life span than in all the 57 other consecutive life spans which take us back to the building of the pyramids.

* * *

If you have gotten the significance of what the 58 octogenarians have been attempting to tell you, and I think you have, you now have a new perspective of time and progress. You will conclude, as I have, that civilization is much younger than we thought it was, and that mechanization, the child of science and invention, is a mere infant. You will also have obtained an impression of rapidly increasing tempo. A giant's foot is stepping upon the accelerator.

Consider, if you please, that while simple tools or machine elements, such as wheels, levers and wedges were known and used by most of our fifty-eight octogenarians, it is only during the times of the most recent five or six of them that these elements have been combined into what we would call machines. It is only during the last three life-spans that machines have been driven by other than animal, wind or water power. It is only during the present life span that electricity has been enlisted as a servant of mechanization.

There has been more improvement in mechanization during the past century than in all of those that preceded it; there has been more improvement in mechanization during the past twenty-five years than in all of the remainder of that century.

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Increasing tempo of invention and mechanization. A giant foot upon the accelerator. Why is it?

Is it because, as some believe, the great masses of humanity are being enslaved, through the machine, for the benefit and enrichment of a comparatively few owners and entrepreneurs?

That theory might have been true in the days of the building of the pyramids, before the dawn of mechanization in the era of the simple lever and wedge in the lifetime of octogenarian number 58. It is not true today, when our modern mechanisms derive their patronage, not from the few but from the many.

No, my friends, the foot upon the accelerator of mechanization is too large and too heavy to be applied merely by ownership or management. It is the collective foot of the majority of humanity, applied under the universal urge to save time and thereby lengthen life.

For years, men sought the mythical fountain of perpetual youth. For years, men have sought the means of lengthening the life span. And now we have, after vain search for impractical and impossible magical chimeras, discovered that mechanization has the power of lengthening our lives by enormously increasing our experiences and possessions.

No, my friends, it is not the dollar saving urge that has increased the tempo of mechanization. It is the universal time saving urge. Dollars cannot add to the span of life, but time savings do. The average man of today, because of the fruits of mechanization, has a longer life, measured in experiences, actions, contacts and accomplishments than did the fabled Methuselah.

Radio, a product of mechanization, in a few hours brings us more experiences and happenings than Methuselah enjoyed in his whole life time. One evening at the mechanized movies gives us more thrills and experiences than our grandfathers encountered in a decade.

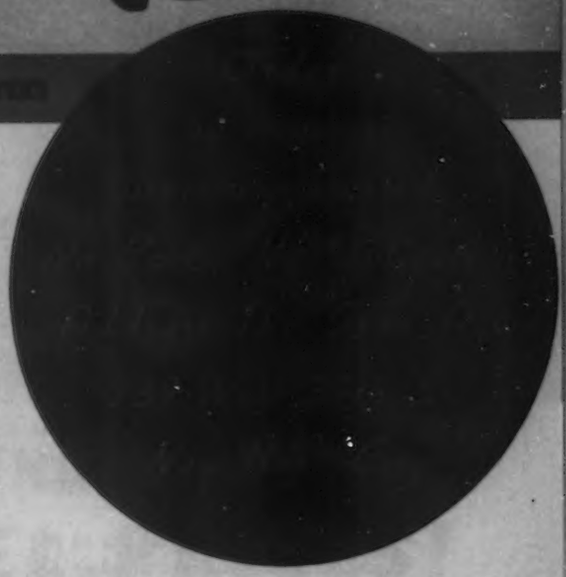
Einstein's belief in the relativity of time is borne out by the fruits of invention, discovery and mechanization, which, by speeding up the rate of living, actually stretches time.

No, it is not a money urge, a profit urge which has fostered and quickened mechanization. It is a time saving urge. The match replaced the flint and steel, in spite of the fact that its use cost more, because it saved time in lighting fires. Even today's automobiles, in first cost and upkeep are more expensive than horses and buggies.

It is not so much that the average man is eager to get more for his money that supplies the urge to progressive improvement in machines; it is because he wants to cram an increasing content of experiences and possessions into his allotted and limited hours of life expectancy.

That is why we shall never go back to the horse and buggy age. That is why attempts to handicap and hobble the growth of mechanization have been and will be futile. The people want what the machine has to give. It would be an easier task to make Niagara Falls flow

# New Industrial Literature



**HYDRAULIC PRESSES.**—Lake Erie Engineering Corp. Folder describes 500-ton forming presses used in the aircraft industry for deep drawing duralumin parts. Design of presses permits the use of laminated wood dies. Bulletin 10-184.

**ELECTRIC MOTORS.**—Louis Allis Co. A comprehensive general catalog devoted to all types of electric motors, including splash proof, explosion proof and totally enclosed fan cooled types. Numerous photographs show construction features and charts covering the operating characteristics of the various types are included. Bulletin 10-185.

**STEAM TURBINE UNITS.**—Allis-Chalmers Mfg. Co. Bulletin No. 1180 covers reaction type turbo generator units of 1500 to 5000 kw. capacity. Photographs and drawings illustrate separation of oil and steam piping to eliminate the possibility of oil fires, separate steam chest and four-bearing construction. Bulletin 10-186.

**COLORED METALS.**—American Nickeloid Co. Folder contains samples of Tint-Metal, a prefinished metal available in various colors. Material is rust and tarnish proof and may be stamped and formed without damage to the finish. Bulletin 10-187.

**GALVANIZING.**—Meaker Co. 40-page publication describing Meaker Process galvanizing, practice for electro-galvanizing round wire and wire cloth galvanizing machines. Fully illustrated and contains 36 pages of practical plating information. Bulletin 10-188.

**PULLEYS.**—Equipment Engineering Co. Bulletin illustrating and describing the Hi-Lo automatic pulley, which gives variable speeds with standard constant-speed motors. List prices included. Bulletin 10-189.

**FLEXIBLE METAL HOSE.**—Chicago Metal Hose Corp. 26-page catalog covering construction and various applications of Rex-Weld and Rex-Tube flexible metal hose. Cut-away sections, diagrammatic drawings, charts, sketches, engineering data and specification tables are included. Bulletin 10-190.

**INSERTED TOOTH SAWS.** — Pittsburgh Tool-Knife & Mfg. Co. Catalog describes Pittsburgh inserted tooth saws, and drawings in actual size show the various types and sizes of teeth available. Gives list prices of saws complete as well as of separate teeth and wedges. Bulletin 10-191.

**HYDRAULIC GRINDERS** — Thompson Grinder Co. Bulletin describes hydraulic grinders for wet or dry work. Grinders feature all direct drives, hydraulic rapid traverse and hydraulic wheel truing. Magnetic chuck equipment is also illustrated. Bulletin 10-192.

**CHEMICAL RESISTANT FINISHES.** — Roxalin Flexible Lacquer Co., Inc. Folder contains a summary of the properties of air-drying or baking flexible lacquer possessing high resistance to perspiration and corrosive chemicals. A second folder describes a clear, cellulose type, air-drying lacquer which prevents the oxidation, fuming or marring of cadmium plate. Bulletin 10-193.

**BAKING AND DRYING OVENS.** — Dispatch Oven Co. Bulletin illustrates batch type finish baking and drying ovens and shows some typical applications in finishing departments. Bulletin 10-194.

**METAL-CASED MERCURY CONTACTS.**—Jefferson Electric Co. Bulletin 371-MT describes and illustrates Ferro-Tube mercury contacts which are used in current making and breaking devices. Both grounded and insulated tubes are shown, with complete ratings. Bulletin 10-195.

**UNIT HEATERS** —Airtherm Mfg. Co. A novel manner of preventing the accumulation of high temperatures under the roof of factories heated with unit heaters is described in this bulletin. Bulletin 10-196.

**WATER COLUMNS AND GAGES.** — Yarnall-Waring Co. Bulletin WG-1805 gives complete details of the Yarway floatless Hi-Lo alarm water columns and a complete line of water level gages for pressures up to 1500 lbs. Bulletin 10-197.

**TRANSFORMERS.**—General Electric Co. Bulletin GEA-2434 describes the new indoor potential transformers in capacities from 6900 to 13,800 volts. The transformers are designed to meet the new and higher insulation standards of modern transformer application. Bulletin 10-198.

**VARIABLE SPEED TRANSMISSIONS.** — Graham Transmissions. Bulletin explaining and illustrating Graham variable speed transmission. Descriptive text covers features and includes tables of dimensions, specifications, diagrams and list prices. Bulletin 10-199.

**REGULATORS.**—Shallcross Controls, Inc. Folder explaining collector main regulator for coke plants. Diagrams and operating cycle are included as well as a discussion of mechanical details. Bulletin 10-200.

**DIESEL-ELECTRIC MOTIVE POWER.** — Westinghouse Electric & Mfg. Co. Illustrated publication showing the methods of manufacture and outstanding features of Westinghouse electrical equipment for diesel-electric motive power. Bulletin 10-201.

**PORTABLE ELECTRIC TOOLS.**— Wodack Electric Tool Corp. Bulletin illustrates and describes complete line of portable electric tools. Detailed features of Do-All combination electric hammer and drill are included. Bulletin 10-202.

**ARC WELDING.**—Harnischfeger Corp. Folder describes how modern welder design meets requirements of current characteristics. Includes technical data and a discussion of Hansen Smootharc welding generators. Bulletin 10-203.

**COMBUSTION CONTROL.** — Shallcross Controls, Inc. Bulletin covers combustion control for steam boilers. Control is diagrammed and purpose, operation and construction is explained. Bulletin 10-204.

**BEARING METAL.**—Moraine Products division, General Motors Corp. Handbook on Durex, a special bronze bearing metal which is said to possess the ability to absorb lubricating oil and to feed it to the rubbing surface, thus maintaining a protective oil film between journal and bearing at all times. Engineering data on application are included. Bulletin 10-205.

**HAND LIFT TRUCKS.**—Yale & Towne Mfg. Co. Folder describes hand lift trucks and skid platforms of various types for industrial application. Complete specifications included. Trucks of special design for handling tin plate, cable reels, etc., are also illustrated. Bulletin 10-206.

**PYROMETERS, INDICATING, RECORDING AND CONTROLLING.**— The Brown Instrument Co. Catalog No. 1102, has 48 profusely illustrated pages devoted to descriptions of potentiometer and millivoltmeter types, including the new "Electro Line" controllers and the Brown proportioning control system. Potentiometer controllers are supplied with three types of records: continuous ink, colored dot-circle and colored numeral records. Full-size chart reproductions are included. Bulletin 10-207.

uphill than to stem the irresistible tide of science, invention and improvement.

* * *

It is true that there are some who would like to turn the clock back, believing that mechanization is the root of all evil.

Mahatma Gandhi, for example, who has reached that stage of perfection that can be satisfied with a sheet and a little goat's milk, carries with him a primitive spinning wheel. When asked if it wouldn't be better to replace the archaic device with something modern he replied, "modern machinery would give our people too much leisure."

There are those in America, too, who would have us go back to the "good old days" when skilled fingers and strong backs did much of the work that is now done by machinery. Let us go back, in imagination for a moment, to those good old days which, thank God, none of us here have been obliged to experience.

We do not have to go back to the times of octogenarian number 58, when toiling slaves under the urge of the taskmaster's lash spent their short and toilsome lives dragging the blocks which were to comprise a tomb for Egyptian royalty.

No, we can find these "good old days" in the lifetime of octogenarian number two, when English women worked 14 hours a day in the British coal mines, chained to coal cars, crawling on hands and knees to drag these cars through tunnels that were too low to permit the use of mules.

Or, if you like, we can go back to the infancy of octogenarian number one, who is alive today; to the period a few years before the invention of the sewing machine. Those were days portrayed by the poet Thomas Hood, who immortalized the toils of the sewing woman in his "Song of the Shirt."

"With fingers weary and worn
With eyelids heavy and red
A woman sat in unwomanly rags,
Plying her needle and thread.
Stitch-stitch-stitch
In poverty, hunger and dirt
And still, in a voice of dolorous pitch,
She sang the song of the shirt.
Work, work, work,
'Till the brain begins to swim,
Work, work, work,
'Till the eyes are heavy and dim.
Work, work, work,
My labor never lags—
And what are the wages? A bed of straw,
A crust of bread—and rags."

Such, my friends, for the great mass of people on this earth, were the good old days before the beginning of the so-called machine age. The days when demand always exceeded supply and there was plenty of work for everybody because human hands and muscles had to do most of it. The good old days when women were cheaper for mine haulage than were mules; the good old days when the average man began his labors as a child of six and was a worn out old man at 35.

Would *you*, if you could, go back to the ways of living and the ways of working of your grandfathers?

Would you exchange your porcelain tub and shower, with its instant hot and cold water for your grandfather's wooden wash tub and the tea-kettle heated on Saturday nights on the wood stove in the kitchen?

Would the average wage earner of today exchange his steam heated flat, his radio, electric light and easy chair for the cold comfort of his grandfather's days, or swap his so-called monotonous 40-hour working week for the task of hoeing potatoes for 14 hours per day?

No, he would not, because, though he may not realize it, he has been enriched by the machine. For it is not the number of dollars in the pay envelope that determines one's prosperity, it is what those dollars will buy. And they can only buy those goods and services that have been made available. They cannot buy what does not exist.

No pay envelope or salary check or dividend or bond coupon, in 1880 was big enough to buy an automobile or a radio or an electric washing machine or a porcelain bath tub or an incandescent lamp for the home.

No pay envelope, in 1880, was big enough to obtain the services of an X-ray machine for a diagnosis or to hire a seat at the movies or to purchase a motor bus ticket or to secure a seat in an airplane.

Incomes could not do this, whether they were large or small, because these goods and services *did not exist*. They had not yet been brought into existence because mechanization had not developed sufficiently to produce them.

Developments in mechanization have brought into being the thousands upon thousands of products and services that are available today and which did not exist in 1880. These products and services, in their abundance or their scarcity, mark the prosperity or the poverty of the community, both as to private and as to public domain. Your municipal sanitation, fire protection, water supply and the like are all, directly or indirectly, products of the machine and dependent upon it for their existence.

Mechanization is the greatest multiplier and equalizer of wealth that the world has known. The machine has to work for the many, or go out of business. Can you imagine any branch of mechanized industry succeeding or even surviving by turning out products for our few millionaires?

Ninety-eight out of every one hundred Americans have incomes of less than $3,000 per year. Yet one family in every three owns a motor car. In grandfather's time, not one family in 500 could afford to maintain a horse and buggy.

If you agree that mechanization has been kind to the community as regards public improvement, it follows that it has been good for the individual composing the community from whom your community draws its taxes. The prosperity of the whole can be no greater than that of the sum of its parts. And in this connection, let me cite the fact that Chambers of Commerce in most communities, make every effort to attract new industries to them.

Therefore it must be evident to you that the machine constantly creates new and better working opportunities for those who are associated with it. This is borne out by irrefutable statistics which show that ever since tte beginning of the real machine age, a half century ago, there has been a steady increase in the number of jobs available to our people, per thousand of population of working age. I will not burden you tonight with statistical material but will tell you the story of The House That Jack Built. I refer to the automobile industry.

Aladdin rubbed his magical lamp and, lo and behold, where there had been an empty, grass covered plain stood a marvelous marble palace, complete in every detail.

Henry Ford and other pioneers rubbed the rust from a few ma-

# FROWNING GUNS ON BURNING SHANGHAI

# ROCKET TOOL STEEL PRICES!

# MO-MAX*

## Molybdenum-Tungsten High Speed Steel

## NOT AFFECTED!

As the grim floating fortresses of Japan blockade the China Coast from Shanghai to Hong Kong, the world's major source of tungsten dries up—and the price of tungsten steel rockets to new heights. Requiring but a minor proportion of tungsten, MO-MAX high speed steel is not affected. Thus a distant undeclared war, or even a threat of war, affects the price of high speed steel. It happened before during the World War. It is starting to happen now. It could happen again but for an improved high speed steel that is now available and that is not subject to such fluctuations.

MO-MAX, independent of tungsten imports, has become decisively established as a superior high speed steel. The outstanding advantages of MO-MAX, conclusively demonstrated in the shops of consumers, prove its marked superiority. It is easy to weld, forge, machine and grind. Tools made of MO-MAX are tougher, harder and have superior cutting quality.

Leading steel companies in North America and Europe are now licensed to make MO-MAX. A booklet giving the essential data may be obtained by addressing The Cleveland Twist Drill Company, Cleveland, Ohio.

SHIFT TO MO-MAX FOR QUALITY AND QUANTITY PRODUCTION

*MO-MAX is a proprietary name owned and controlled by The Cleveland Twist Drill Company and its only licensed use by others is on steel made and sold by licensees under U. S. Patent Nos. 1,937,334; 1,998,953; 1,998,954; 1,998,955; 1,998,956; 1,998,957; and Canadian Patent Nos. 346,506; 364,032 and 364,033.

chine tools and behold, where there then stood no industry and no employment, now stands an industrial and business structure that is the eighth wonder of the world.

The building of Aladdin's palace created one night's work for one genie, who worked for no wages. The house that Jack the machine tool built, has created new jobs for millions and billions of dollars of new and broadly distributed income.

Let us take a quick trip through this great edifice that Jack has built in the short space of 35 years. We shall have to use the wings of imagination to do so, because it would take longer than 35 years for one to actually visit the many rooms and the far flung annexes of this mansion.

First, there is the foundation. It is the motor car and truck building plants of the United States. Here is a foundation into the building of which went one billion four hundred millions of dollars, as measured by the present fixed tangible assets of the industry. Merely to put together the bricks and mortar of this edifice and to equip it with machinery, there were wages of more than a billion dollars paid to artisans in other industries.

On this foundation operates an industry which, since its inception, has paid wages to its own workers of more that nine billion dollars.

But this total of ten billions of dollars in wages is merely the beginning of the story of the house that Jack built.

To build the cars which came from the house that Jack built has required over 75 million tons of steel. And because of its making, the steel industry has paid more than one and a half billion dollars in wages to its workers on this account.

To put tires upon the cars that came from the house that Jack built and to replace them when worn out, the rubber industry has produced, since 1900, a total output of tires aggregating fourteen billion dollars in wholesale price value. Eighty per cent, or more than eleven billion dollars of this huge sum, has gone to labor inside and outside of the tire industry.

Other suppliers of parts going into motor cars — forgings, electrical equipment, glass, upholstery and a hundred other items—have distributed, because of the house that Jack built, total wages of well over a half billion dollars.

All of these tributaries of the great river of wealth and wages flowing from the house that Jack built owe both origin and perpetuation to the progress of mechanization.

But this is only the beginning of the story. There are many annexes to the house that Jack built.

Take, for example, the great oil and gas industry. Since the introduction of the automobile, this industry has had to supply the motor-minded public with nearly thirty billion dollars worth of gasoline and lubricating oil. Of this, nearly twenty-four billions have gone into work and wages.

Pipe lines and pumps to transport this golden flow, as well as tank cars for railroad petroleum transportation, have put an additional billion of dollars into pay envelopes.

Road building and improving activities, a direct by-product of the automobile and hence a part of the house that Jack built, have added a full fourteen billion dollars to workers' wages.

Fifteen billions of dollars in wages have been paid to chauffeurs, truck drivers, car repair mechanics and service station employees and parking space attendants since the birth of the motor car.

Seventy-seven billions of dollars of wages created by an industry that was created and is maintained by the machine. Such has been the contribution of mechanization to workers' income in just a part of this one among many houses that Jack has built. Just a part of it, for there are other parts which we will not have time to explore. The part, for example, that consists of more than 300,000 tourist cabins, and half a million road-stands; all of which depend upon the motor car. The part, too, which creates "white collar" employment and wages in the show rooms and offices of more than thirty-seven thousand American automobile dealers. The employment created in railroads of our country by the transportation of automotive raw materials and of finished products. Employment in non-ferrous mines and refineries and mills; in textile plants. Employment, too, of the army of Government workers who are supported by the flow of taxes from the house that Jack built.

Has mechanization been a destroyer of jobs? Against the nebulous arguments of the theorists who say it has, we marshal this huge, provable and realistic army of seventy-seven billions of wage dollars in refutation. Seventy-seven billions of dollars in wages represents at least one hundred billion hours of employment. Of employment due strictly to the wealth creating and job creating power of mechanization expressed through the machine tool. Of new jobs and new wages created in the short span of 35 years. A veritable ocean of employment opportunity spreading its work giving waters from ocean to ocean and from coast to coast.

Aladdin would have had neither the imagination nor the temerity to wish for such an edifice as the machine tool has brought into being. And no genie could have made the wish come true.

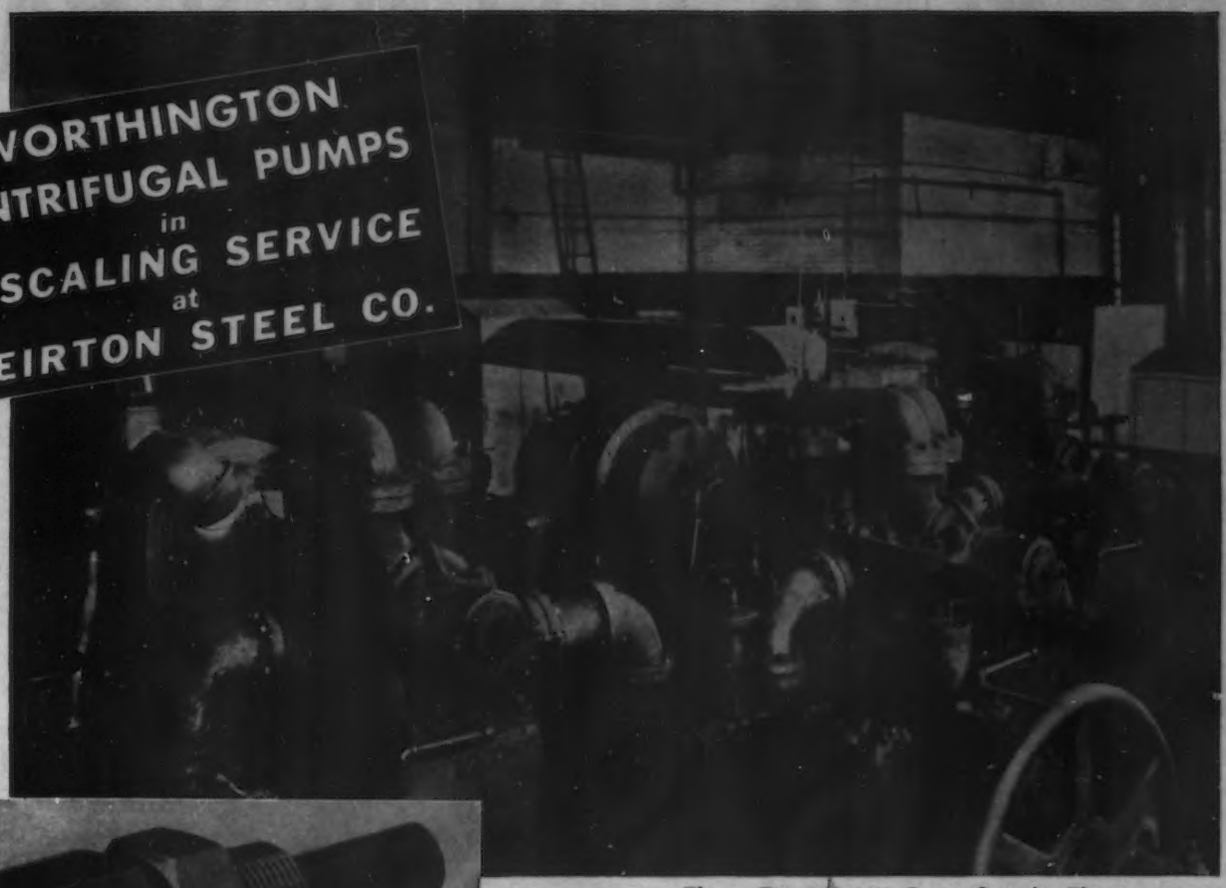
This great house that Jack built is but one of many. Radio, refrigeration, air transportation and hundreds of other industries providing wide employment for labor owe their existence and their perpetuation to the magic wand of mechanization.

* * *

Today, the man in the street, as well as the man in the mill and his employer as well as his stockholders, are deeply pondering the why's and wherefor's of economic and industrial relationships. Conflict? Yes. You can have no progress without conflict nor can you have permanent gain without an opposition to test, oppose and thereby sort out the wheat from the chaff of new ideas. You cannot sharpen a tool without exposing it to the friction of the grindstone.

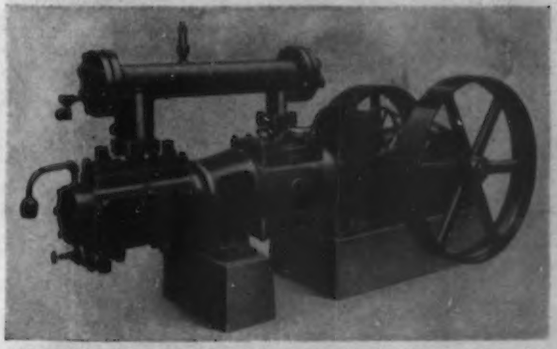
I am not among those who believe that America and civilization are going to the dogs. Out of this conflict of ideas, I can see arising, like a phoenix from the ashes of debate, a new conception of responsibility to the community on the part of both capital and labor. Let each of them realize his responsibility to the community, and conform his private actions to it, and you will have solved the problem of industrial relations. For successful and prosperous communities mean successful enterprises for capital as well as happiness and contentment for labor.

# WORTHINGTON CENTRIFUGAL PUMPS in DESCALING SERVICE at WEIRTON STEEL CO.



*Three Type 6-UX Centrifugals. These pumps deliver 550 g. p. m. at 1050 lb. pressure*

*Worthington Standard Spray Nozzles offer several exclusive features*



*Worthington Single Tandem Two-Stage Charging Compressor . . . 1200 lb. per sq. in. discharge pressure*

## COMPLETE WORTHINGTON DESCALING SYSTEMS

*for any type of mill . . .*

include a wide range of centrifugal and reciprocating pumping units to meet exactly the requirements of any installation.

●

**WORTHINGTON PUMP AND MACHINERY CORPORATION**

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# WORTHINGTON

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DALLAS DENVER DETROIT EL PASO HOUSTON KANSAS CITY LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON

# TWO YEARS RESEARCH BACK

## *Superior Cold-Forging Process Replaces Milling From Bar Stock*

### 25 YEARS EXPERIENCE IN COLD-FORGING GIVES PARKER-KALON AN ADVANTAGE

It is an accepted fact that forging adds strength to steel—and strength is one of the essential requirements in Socket Screws. That is why Parker-Kalon decided in favor of cold-forging their Socket Head Cap Screws, Socket Set Screws and Socket Head Stripper Bolts instead of milling them from the bar. The cold-forging process provides against head breakage and other structural failures by retaining the fibrous structure of the steel and obtaining a concentration of metal at all points subject to strains.

**Scientific Heat Treatment Assures Unvarying Uniformity**

Uniformity of the physical and metallurgical characteristics of Parker-Kalon Socket Screws can be definitely depended upon because every size and type is put through an individual laboratory-controlled routine of heat treatment.

Cold-forging retains unbroken fibrous structure and increases strength at points subjected to greatest stresses. Note also flat base socket—wrench seats to bottom.

## NEW COLD-FORGED SOCKET SCREWS ACCEPTED ON MAKER'S REPUTATION

*Industry Welcomes Latest Parker-Kalon Product*

**"Amazed at Wonderful Reception" . . . Salesman for Large Philadelphia Distributor Reports**

Leading mill supply distributors and hardware jobbers all over the country who have already begun to introduce Parker-Kalon Cold-forged Socket Screws report that their customers accept them without question or hesitation. Engineers and shop men take the quality of these new products for granted, knowing Parker-Kalon's reputation for producing screw products of the highest quality.

One Philadelphia jobber's salesman, after soliciting business for Parker-Kalon Socket Screws, writes: "I was frankly amazed at the wonderful reception which your product received and am greatly impressed with the attitude of the larger screw users, which is: If the product is made by Parker-Kalon, it must be O.K."

**New Products To Be Sold Through Recognized Distributors**

The new Parker-Kalon Cold-forged Socket Screws will be sold through recognized distributors all over the country, consistent with the maker's long established policy based on the confirmed belief that —"distributors serve industry economically".

*Get Samples - Compare*

CLIP THIS COUPON TO YOUR LETTERHEAD

PARKER-KALON CORPORATION
200 Varick St., New York

Please send samples as checked:

Socket Set Screws ☐
Socket Head Cap Screws ☐
Socket Head Stripper Bolts ☐

# PARKER-KALON

# OF NEW SOCKET SCREWS

**LABORATORY PLAYS IMPORTANT PART**
The Parker-Kalon Mechanical and Metallurgical Laboratory is a constant safeguard of the quality of Parker-Kalon Modern Fastening Devices.

## $250,000 SPENT FOR LABORATORY EXPANSION

*Parker-Kalon Equipment for Research, Development and Control of Quality Has No Counterpart in Screw Industry*

It was obvious to Parker-Kalon that in order to produce Socket Screws of exceptional merit, it was absolutely necessary to have complete facilities for determining the good qualities as well as any shortcomings of the Socket Screws already on the market because only with that knowledge could they turn out a product that would embody only the good characteristics of the others.

They saw, too, that it was equally important to provide the most modern equipment as well as a highly trained personnel to maintain the standard of quality which this research would establish.

These very practical reasons explain why Parker-Kalon invested more than a quarter million dollars to expand the facilities of the Parker-Kalon Mechanical and Metallurgical Laboratory. Every modern scientific aid was provided for the determination and control of all physical and metallurgical characteristics which the uses of Socket Screws demand.

Editors of leading industrial publications who have seen these facilities proclaim them as having no counterpart in the screw industry.

**DETECTS VARIATION OF 1 1,000,000 OF AN INCH**

**This amazing instrument developed and built in the Parker-Kalon Laboratory checks gauge blocks used to maintain the accuracy of all production gauges. It is sensitive to variations as minute as one millionth of an inch, and gives direct readings.**

## *Parker-Kalon Announcement Ends Speculation About Its New Product*

## RESULTS JUSTIFY LARGE EXPENDITURE OF EFFORT AND MONEY

This month the attention of the metal working industry will be focused on the Socket Screws developed by Parker-Kalon Corporation who, while new in this particular branch of screw manufacture, has for years been recognized as a leader in the fastening device field.

Formal announcement of the new line of products ends the interested speculation concerning them which began when it became known that Parker-Kalon was preparing to enter the Socket Screw field and would offer a product of exceptional merit. Much was expected of this concern because of the ingenuity it has frequently exhibited in producing meritorious fastening devices, among which are the now famous Parker-Kalon Hardened Self-tapping Screws. It was a commonly expressed opinion that if Socket Screws could be improved, Parker-Kalon would be likely to improve them.

### Task Took Over Two Years

An executive of Parker-Kalon, describing the effort put into the new products, makes it clear that the Company took a big job upon itself when it decided to enter the Socket Screw field. He states: "It took well over two years of intensive research and development work to produce Socket Screws good enough to uphold our reputation. We had to do more than produce a 'good' product because good ones were already on the market.

"In reviewing the work it seems that the biggest advantage we had was the ability to begin at the beginning, without preconceived ideas or existing equipment. We could, and did, take full advantage of the many modern developments in metallurgy and in the mechanical arts.

### Spent Fortune In Laboratory

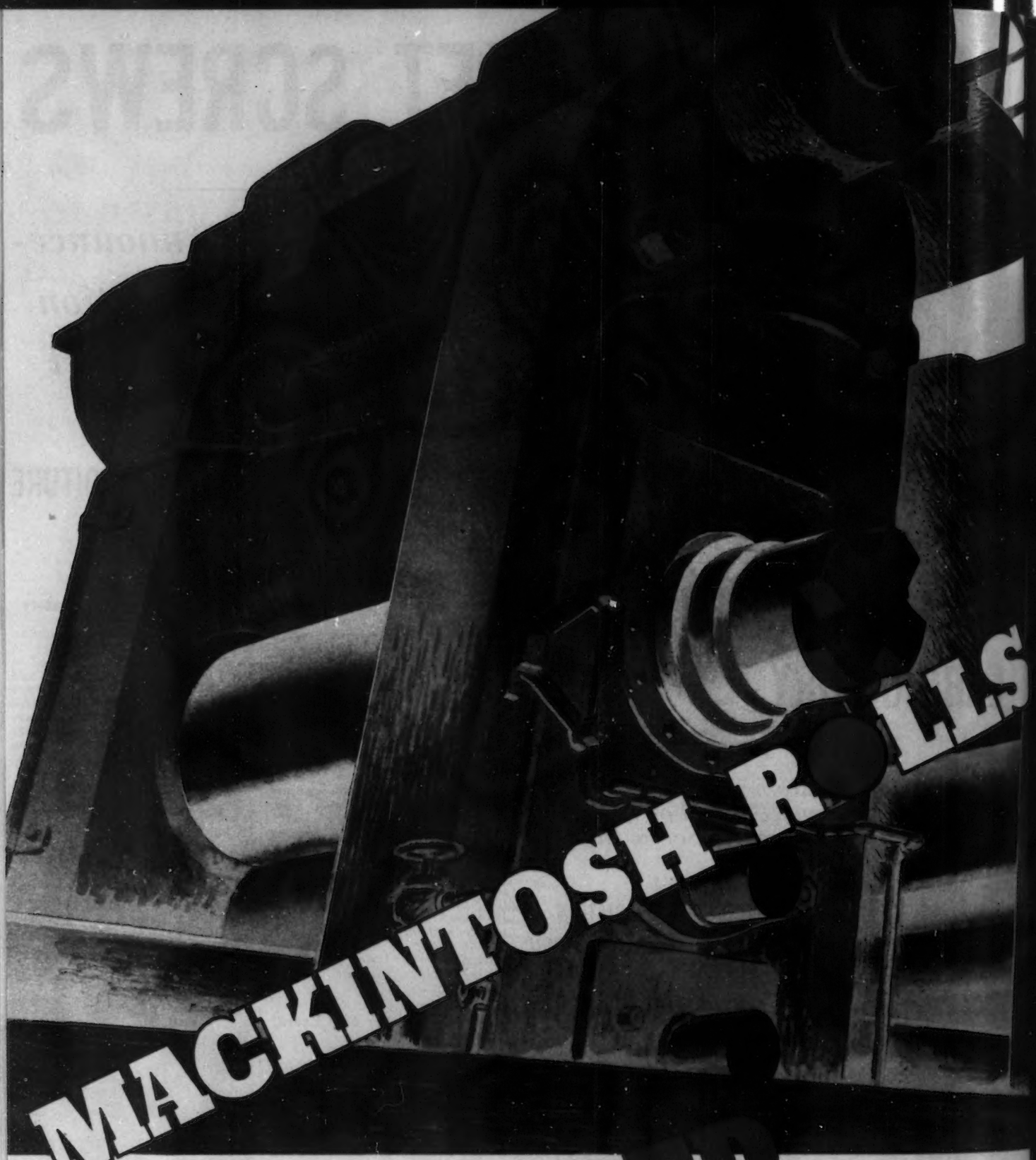
"We spared no expense to accomplish the result we were after. A good example of that is found in the Parker-Kalon Mechanical and Metallurgical Laboratory where we invested a sizable fortune for the additional facilities necessary to develop Socket Screws of the highest quality; and to maintain that standard in production."

### Details and Samples

Parker-Kalon has concisely covered the details of their new Socket Screws in an illustrated bulletin which is offered to users of Socket Head Cap Screws, Socket Set Screws and Socket Head Stripper Bolts. This bulletin together with samples of the new products for inspection and test will be sent upon request.

**QUALITY SAFEGUARDED**
From the rod to the finished product Parker-Kalon Cold-forged Socket Screws must pass 28 metallurgical and physical inspections.

*Cold-forged* **SOCKET SCREWS**




## THE ROLL WITH THE RED WABBLERS

Mackintosh-Hemphill Co. has been able to reach a high performance average on Work Rolls and Backing Up Rolls for 4-high Strip Mills because of its modern equipment and the technical supervision of the various phases of manufacture. Rolls for modern mills of this type *must be uniform* to avoid expensive mill shutdowns and corresponding loss of production. Accurate chemical and physical control, the use of virgin scrap and alloys, competent supervision and proper applications of the various grades and types insure you maximum quality production. Why not let Mackintosh-Hemphill prove the above statements in *your* mill. We assure you it will be a pleasure. *Our representatives are qualified to make proper recommendations.*

MACKINTOSH HEMPHILL CO.

# MACKINTOSH STEEL CASTING

ONE OF MACKINTOSH-HEMPHILL'S LARGEST PLANTS DEVOTED EXCLUSIVELY TO THE PRODUCTION OF STEEL CAS INGS . . . 1,000 to 90,000 POUNDS . . . ACID OPEN HEAR PRACTICE . . . CLEAN, TRUE TO PATTERN AND TO CHEMIC AND PHYSICAL SPECIFICATIONS.

PITTSBURGH AND MIDLAND PENNA

# HERE IT IS!

**A NEW catalog devoted to Boston Ratiomotors and Reductors. 96 pages of specifications, prices and valuable engineering data. Over 700 different ratios, types and sizes in stock for immediate delivery.**

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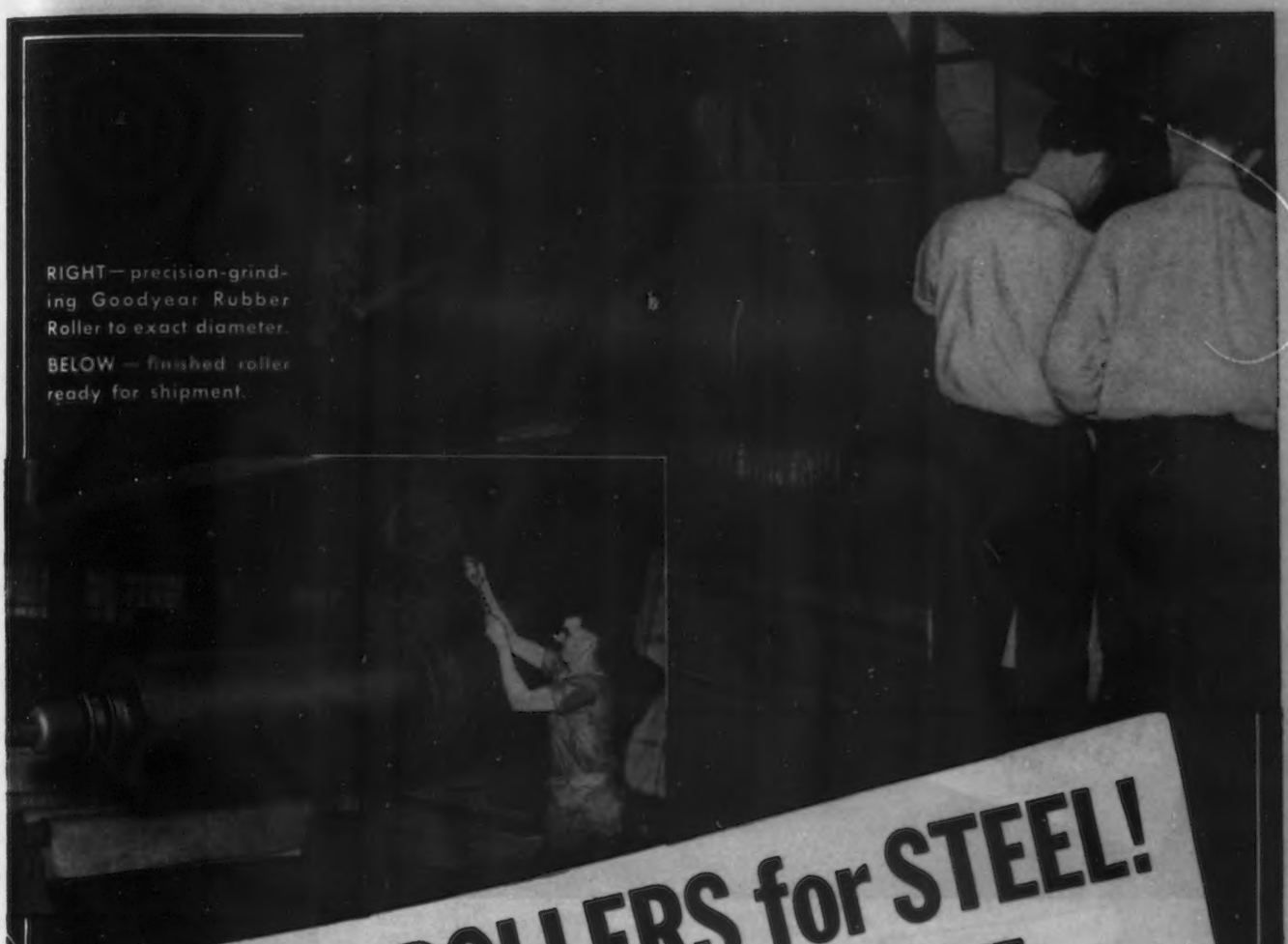
**BOSTON GEAR WORKS, INC., North Quincy, Mass.**



RIGHT—precision-grinding Goodyear Rubber Roller to exact diameter.

BELOW—finished roller ready for shipment.

# RUBBER ROLLERS for STEEL!

## A GOODYEAR DEVELOPMENT

THE enviable reputation for long, low-cost service enjoyed by Goodyear Rubber Wringer and Scrubber Rollers in sheet steel mills and galvanizing plants is due to the fact that they are correctly compounded for each individual job after careful analysis of your needs by the G.T.M.—Goodyear Technical Man.

This exact specification, plus Goodyear's vast experience as the world's largest compounder and manufacturer of rubber, results in rollers that deliver exceptionally economical performance under the severest operating conditions. Only the highest quality rubber is used, specially compounded to resist the abrasion incident to wringer and scrubber service, yet *Goodyear Rollers are sufficiently pliable to perform their work with high efficiency.*

Because of their high quality and correct compounding Goodyear Rubber Rollers may be reground, when necessary, right in the mill—eliminating the delay and expense of shipping back to the factory for regrinding.

**Consult the G.T.M.**

You have only to install one set of Goodyear Rubber Rollers to be quickly convinced of their superior performance. They can be supplied complete on shafts built to your specification, or applied to your present shafts. The G.T.M. will be glad to give you complete information—to bring him to your mill just write Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.

BELTS
MOLDED GOODS
HOSE
PACKING
Made by the makers of Goodyear Tires

THE GREATEST NAME IN RUBBER

GOODYEAR

INDUSTRIAL RUBBER ROLLERS

Truck illustrated made by Automatic Transportation Co., Inc.

# "You can't realize what an electric industrial truck is capable of until you use an Exide-Ironclad Battery"

TODAY'S production conditions demand material handling on a larger scale than ever before. For this purpose electric industrial trucks of far greater capacity and wider versatility have been developed, placing in the hands of the steel industry a newly efficient tool for speeding up production and cutting costs.

Already users have found that these giant new trucks can deliver an entirely new order of performance when equipped with Exide-Ironclad Batteries. For Exide-Ironclads have almost unlimited reserve power ready at an instant's notice to perform phenomenal tasks. They maintain a consistently high voltage, which assures good vehicle speeds at all times. They are rugged, trouble-free and long-lived.

24-hour service is readily obtained from these batteries, with two sets of batteries per truck. Removing a discharged battery and replacing it with a freshly charged unit takes but a minute or two with any of the speedy battery changing systems now in use. Why not write for new, free booklet on this subject—"Battery Changing Systems and Equipment"?

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

*The World's Largest Manufacturers of Storage Batteries for Every Purpose*

Exide Batteries of Canada, Limited, Toronto

## TYPICAL COMMENTS FROM TYPICAL USERS OF MELTRITE

"It used to be from 30 to 35 minutes after we put the wind on that the first tap was ready. Now, it only takes about 20 minutes. The succeeding taps were at about 10 minute intervals and now we tap every 5 minutes. This cuts down our pouring time considerably." — From a large jobbing foundry

. . ."they (MELTRITE PIGS) are far better to handle and on account of the fact that they spread more, the charge seems to pack better in the furnace. They also melt faster, and all in all represent quite an appreciable advantage." — From an automobile specialties manufacturer

. . ."we undoubtedly get more even melting with these small pigs (MELTRITE) and the chances of getting oxidized iron are greatly reduced. Another advantage is that they are not so hard on a cupola lining because as the iron melts in a cupola and drops lower, heavy pigs have a tendency to score the linings in vertical grooves." — From a stove manufacturer

. . ."we have kept an accurate check of our coke costs per ton of melt for the MELTRITE iron as compared to our former costs. Our figures indicate that we are saving 6.7% in coke costs." — From a stoker manufacturer

. . ."we find that MELTRITE PIGS melt faster and hotter and because of their size it is possible to obtain a more even charge. Also the smaller pigs handle much easier and this, of course, is appreciated by the parties who handle the iron." — From a pump manufacturer

. . ."we are very much pleased with your MELTRITE PIGS. We very much prefer this type of pig for handling, uniform melt, etc." — From a furnace manufacturer

. . ."MELTRITE PIGS being lighter, enable the boys to put them in the cupola and to spread the iron more evenly in the charge. We are more than pleased with the castings as we find that they machine readily and our first loss in the foundry has been decreased." — From a railway equipment manufacturer

. . ."MELTRITE PIG IRON is easier to handle, packs better in the furnaces and melts faster." . . . "a pretty good recommendation for this design of cast." — From a general equipment manufacturer

MELTRITE
(TRADE-MARK)
(REG. U. S. PATENT OFFICE)
PATENT PENDING

# AMERICAN INDUSTRY IS USING MORE AND MORE MELTRITE
PIG IRON

A steadily increasing number of firms are employing MELTRITE. In hundreds of plants it has become the dominant pig iron. In scores of these it is the only pig iron used.

MELTRITE offers very definite advantages:

Easier to handle • Saves melting time • Reduces foundry losses • Produces better castings • Saves fuel and labor • Increases output.

Shown above are extracts from letters in which users tell of the advantages they derive in the use of this smaller pig. Space allows statements from only a few industries—MELTRITE is saving money and aiding quality in all industries requiring pig iron.

**MELTRITE is made by the people who have pioneered in the merchant field.**

PICKANDS MATHER & COMPANY

CLEVELAND • CHICAGO • DETROIT • ERIE • TOLEDO • MINNEAPOLIS • DULUTH • ST. LOUIS

NEW YORK CITY—JAMES C. ALLEY, 261 BROADWAY • PHILADELPHIA, PA.—CARSON, MARSHALL & CO., FRANKLIN TRUST BLDG.

# AGAIN

# UNBRAKO

## steps ahead

## with a New Idea!

Heretofore there has never been a positive way of locking a Set Screw; yet if it works loose there's no telling what may happen. We licked the problem by simply knurling the two top threads of the "UNBRAKO," as shown.

This Knurling raises sharp prongs all around the edge of the thread which dig right into the threads of the tapped hole when the "UNBRAKO" is being tightened up, so it can't possibly work loose.

Tests have proven and our customers, who have already bought about 2,000,000 of them, corroborate that the "UNBRAKO" *Self-Locking Set* positively won't budge once it's tightened up.

Send for Free Sample.

Fig. 1564
Pat. Applied for

*This time it's*

**UNBRAKO**

**SELF-LOCKING**

**HOLLOW SET SCREW**

**STANDARD PRESSED STEEL CO.**

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# COLD WAVE GRIPS NATION

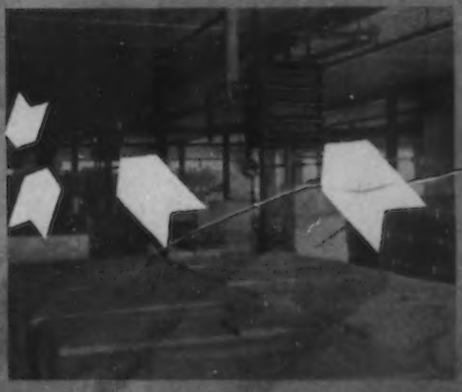
## Will your heating equipment keep production going this winter?

**Those sub-zero days** strike with a bang, tying up traffic and putting heating equipment under a terrific load. Once winter sets in, heating repairs are more difficult to make and may cause costly delays.

**Don't let winter catch you** with a full production schedule and poor or ineffective heating equipment. It is cheaper to let your heating contractor check the heating equipment in your plant now.

**Men can't work effectively** in cold plants no matter how hard they try. Production slumps off—efficiency goes down—time is lost. Get efficient heating equipment now. Buy American Blower Units.

**Airport heating** has to be efficient. That's why so many of the airports are equipped with American Blower Sirocco Unit Heaters. Those big, powerful units heat large areas easily, and at lower costs, too.

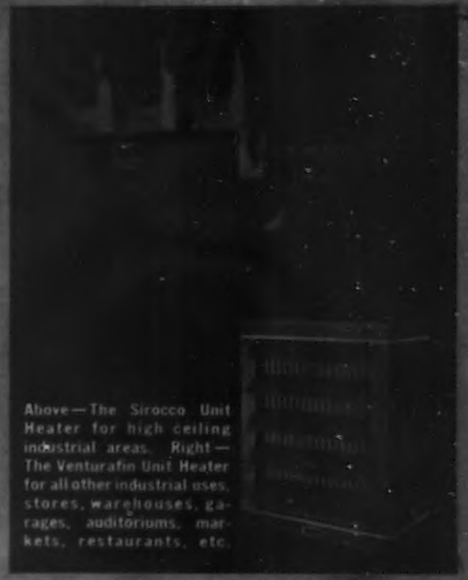


**Thousands** of American Blower Venturafin Heaters are performing their tasks effectively and economically in printing shops, garages, industrial plants, warehouses, service stations, restaurants, markets, etc.

**The bigger the plant** the bigger the heating problem. Good Unit Heaters are the best insurance against cold delays. Temperatures may be automatically controlled and maintained.

**Save valuable space!** This American Blower Unit Heater suspended from the girders overhead forces heat into working areas, cuts heating costs, saves space and prevents damage to heating equipment.

**A. G. Turner,** production manager, says—"American Blower Unit Heaters have cut our costs considerably. We have tried other makes but American Blower Units work better and last longer."



Above—The Sirocco Unit Heater for high ceiling industrial areas. Right—The Venturafin Unit Heater for all other industrial uses, stores, warehouses, garages, auditoriums, markets, restaurants, etc.

American Blower Unit Heaters cost no more than ordinary units. They are carried in stock in all principal cities and may be purchased on long, easy terms through the Heating and Plumbing Finance Corporation. No down payment—3 years to pay. Ask your heating contractor for complete data.

# AMERICAN BLOWER

## INDUSTRIAL UNIT HEATERS

AMERICAN BLOWER CORP., DETROIT, MICH. • Division of American Radiator and Standard Sanitary Corp. • Canadian Sirocco Co., Ltd., Windsor, Ont.

# "NATIONAL" ROLL

CHILLED ROLLS FROM 10" TO 36" DIAMETER

## ROLLING MILL MACHINERY

SPECIAL CHILLED ROLLS
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EXTRA HARD ROLLS FOR BRASS, COPPER, ALUMINUM, ZINC

SPECIAL WORK ROLLS FOR FOUR-HIGH MILLS

**The National Roll & Foundry Company**

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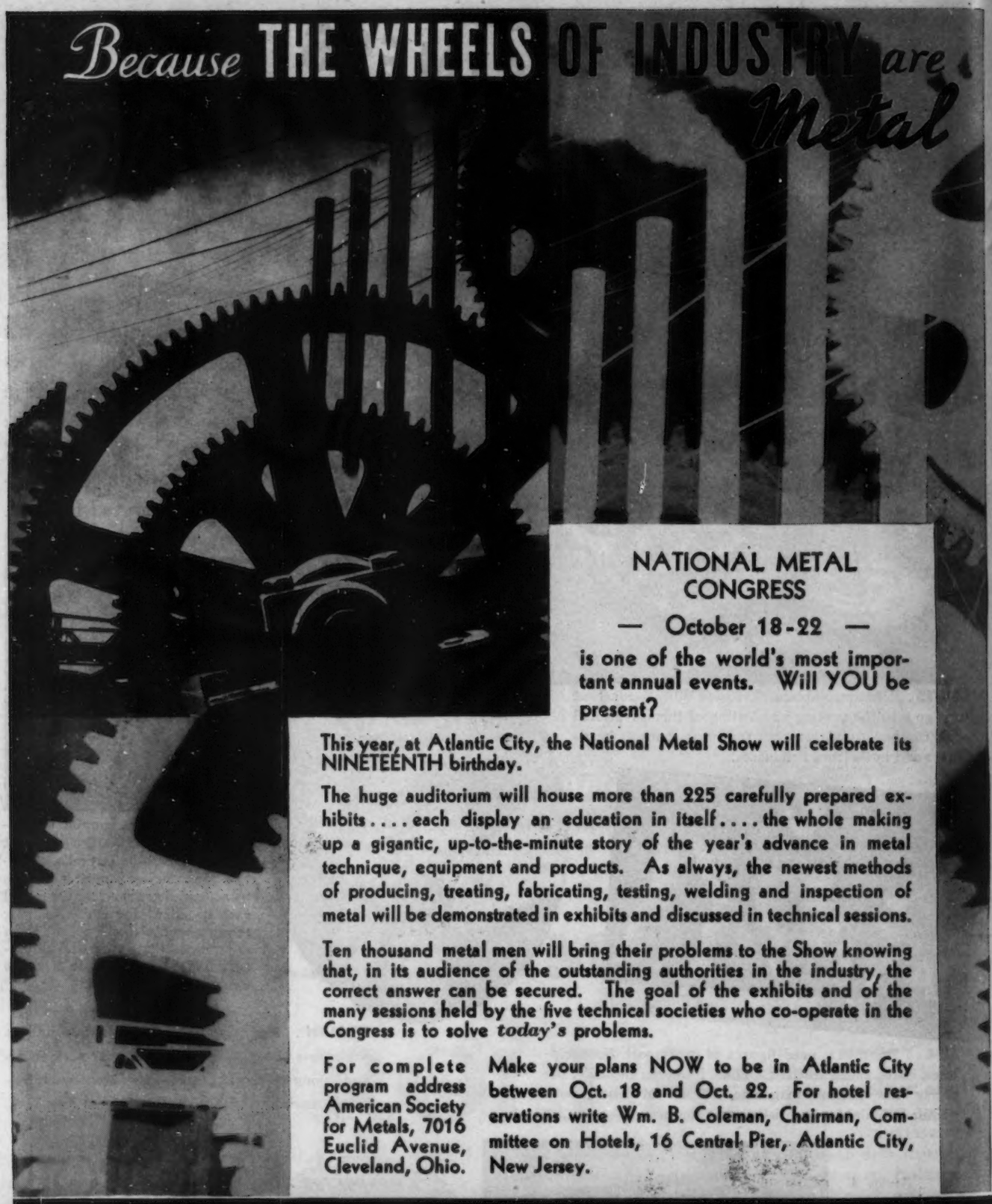



## NATIONAL METAL CONGRESS

— October 18-22 —

**is one of the world's most important annual events. Will YOU be present?**

**This year, at Atlantic City, the National Metal Show will celebrate its NINETEENTH birthday.**

**The huge auditorium will house more than 225 carefully prepared exhibits . . . . each display an education in itself . . . . the whole making up a gigantic, up-to-the-minute story of the year's advance in metal technique, equipment and products. As always, the newest methods of producing, treating, fabricating, testing, welding and inspection of metal will be demonstrated in exhibits and discussed in technical sessions.**

**Ten thousand metal men will bring their problems to the Show knowing that, in its audience of the outstanding authorities in the industry, the correct answer can be secured. The goal of the exhibits and of the many sessions held by the five technical societies who co-operate in the Congress is to solve *today's* problems.**

**For complete program address American Society for Metals, 7016 Euclid Avenue, Cleveland, Ohio.**

**Make your plans NOW to be in Atlantic City between Oct. 18 and Oct. 22. For hotel reservations write Wm. B. Coleman, Chairman, Committee on Hotels, 16 Central Pier, Atlantic City, New Jersey.**

Sponsored by
THE AMERICAN SOCIETY for METALS

October 18-22
ATLANTIC CITY AUDITORIUM

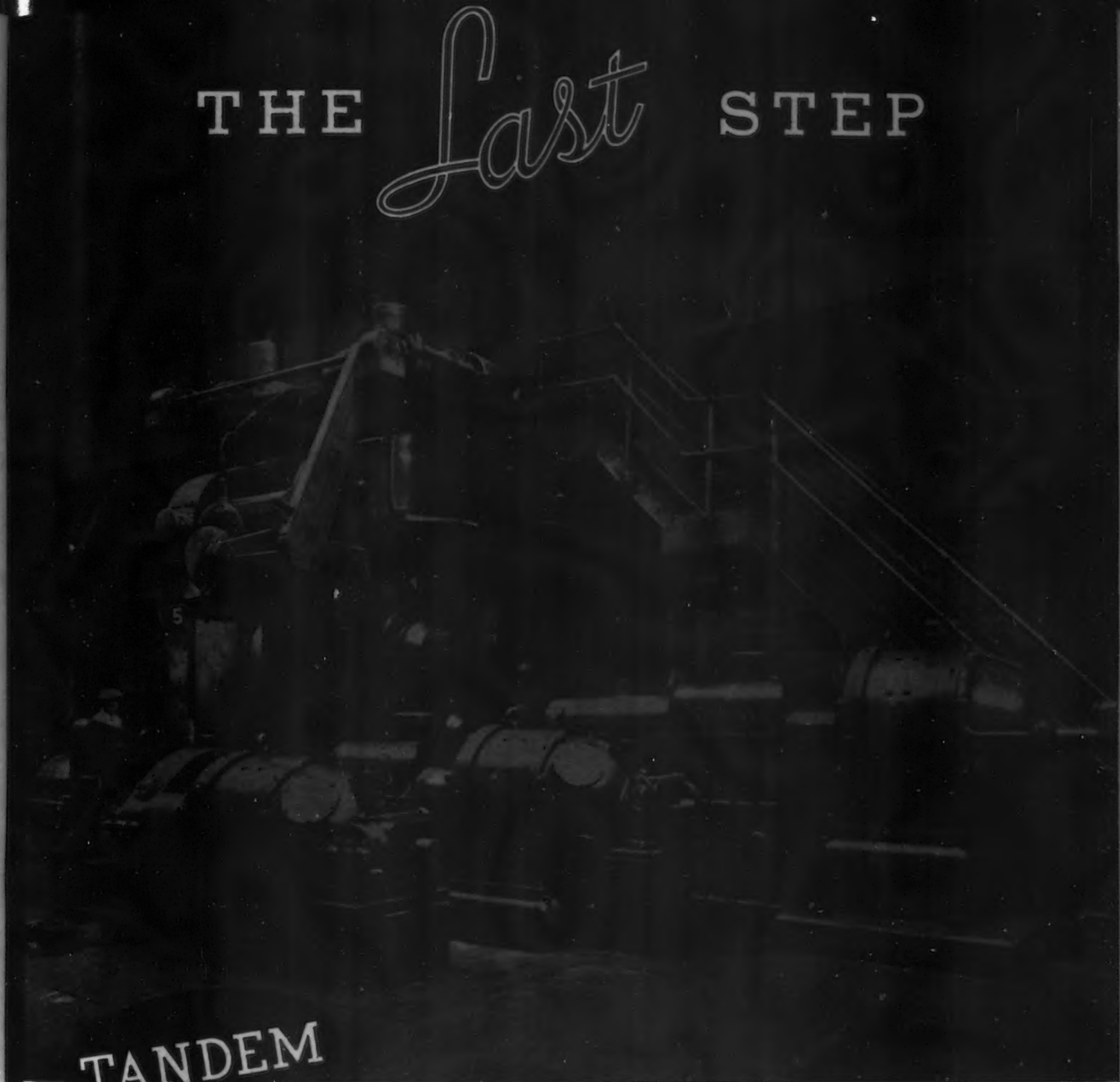
# NATIONAL METAL SHOW

AMERICAN INSTITUTE of MINING & METALLURGICAL ENGINEERS
THE WIRE ASSOCIATION

COOPERATING SOCIETIES

AMERICAN SOCIETY of MECHANICAL ENGINEERS
AMERICAN WELDING SOCIETY

# THE *Last* STEP



## TANDEM TEMPER PASS MILL

**These mills are used as the last stage in the rolling process in the production of tin plate. The strip after leaving the hot strip mill passes through the cold reduction mill, is cleaned and annealed in preparation for the temper pass. After the temper pass the steel is sheared to size, white pickled, passed thru the tin bath and cleaned.**

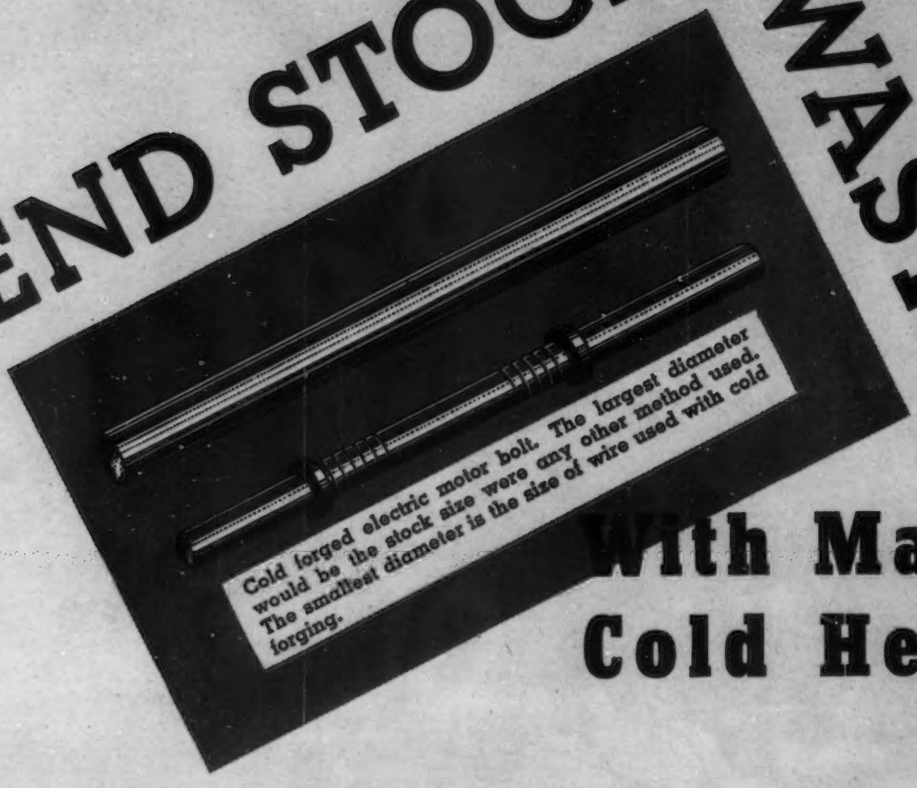
**The unit shown is a two stand mill with drag reel generators, individual stand motors, tension roll motors and delivery reel motor. This is a total of six machines under automatic control. This control maintains tension on the strip in four places independently and automatically. The tension in each case is adjustable from zero to the maximum, and is constant for all reel diameters and during acceleration and deceleration. The usual coil build up is from 20½" to 48". Mills are in operation with strip speed up to 1500 f.p.m.**

ELECTRICAL DIVISION

ALLIS·CHALMERS

MILWAUKEE WISCONSIN

# END STOCK WASTE

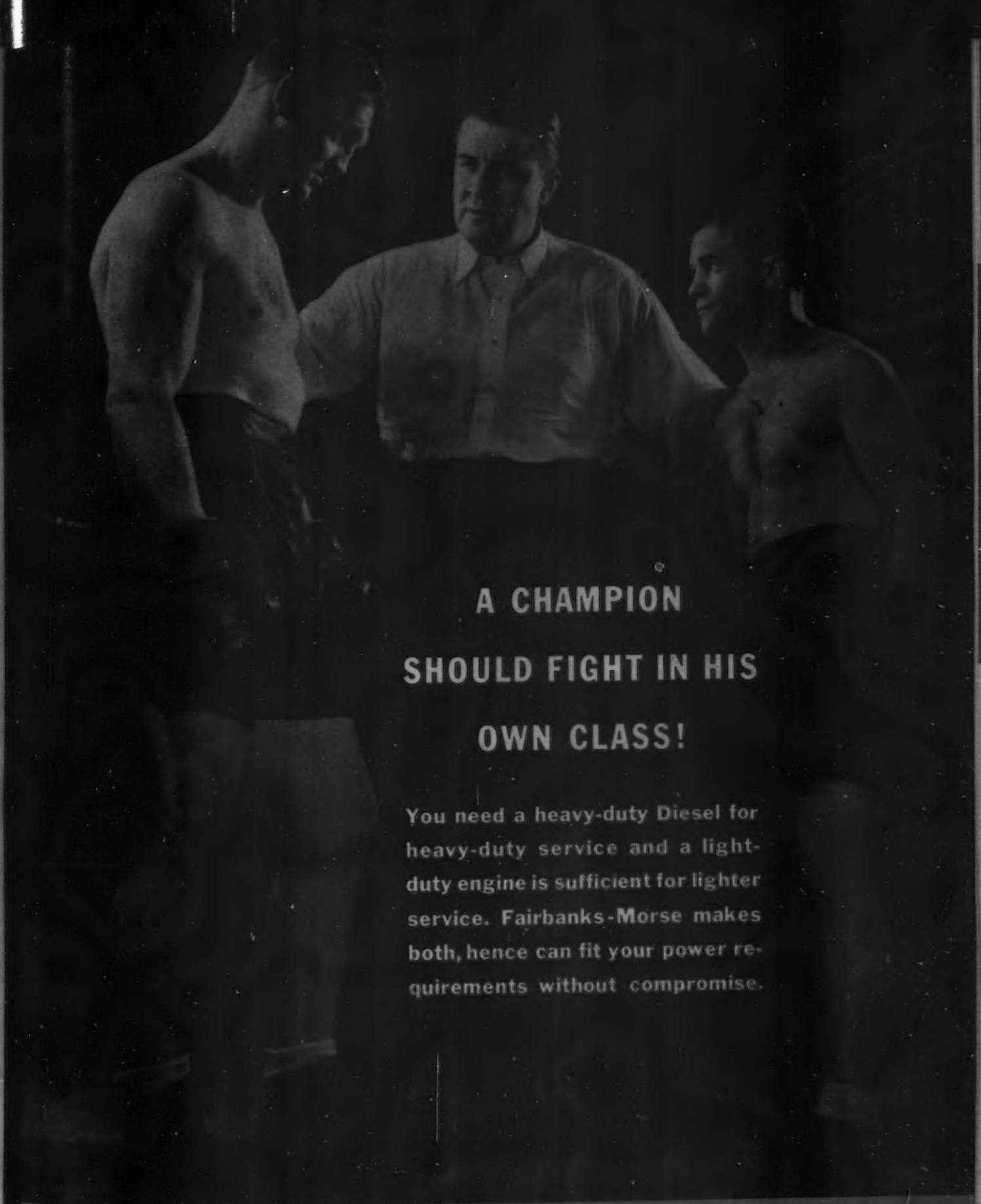

Cold forged electric motor bolt. The largest diameter would be the stock size were any other method used. The smallest diameter is the size of wire used with cold forging.

## With Manville Cold Headers

Stock is no good when it's on the scrap pile. Why put it there? The new way of making small parts ends stock waste. There's no cutting of metal with cold forging. The smallest diameter of the product is the size of stock you use with Manville cold forging machines. All the stock goes into the finished product. None goes to the scrap heap. Besides cutting out stock waste, cold forging small parts brings down the price of stock. Manville's high speed machines use wire in coils instead of bar stock. Wire is about 14% cheaper than rod, so you reduce the cost of stock two ways. And, cold forging is 20% to 70% faster than screw machining or drop forging. You get more done in less time with Manville equipment. Look into cold forging. See whether this new, fast-spreading method can be applied to your production set-up. A complete line of Manville Cold Headers, Screw Thread Rollers, Screw Slotters, Bolt Head Trimmers and Cold Pressed Nut Machines is available.

**E. J. MANVILLE MACHINE CO.**
**Waterbury, Conn.**
**1209 Swetland Building, Cleveland, Ohio**

# MANVILLE
## COLD FORGING MACHINES



# A CHAMPION SHOULD FIGHT IN HIS OWN CLASS!

You need a heavy-duty Diesel for heavy-duty service and a light-duty engine is sufficient for lighter service. Fairbanks-Morse makes both, hence can fit your power requirements without compromise.

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ELECTRICAL MACHINERY
FAIRBANKS SCALES
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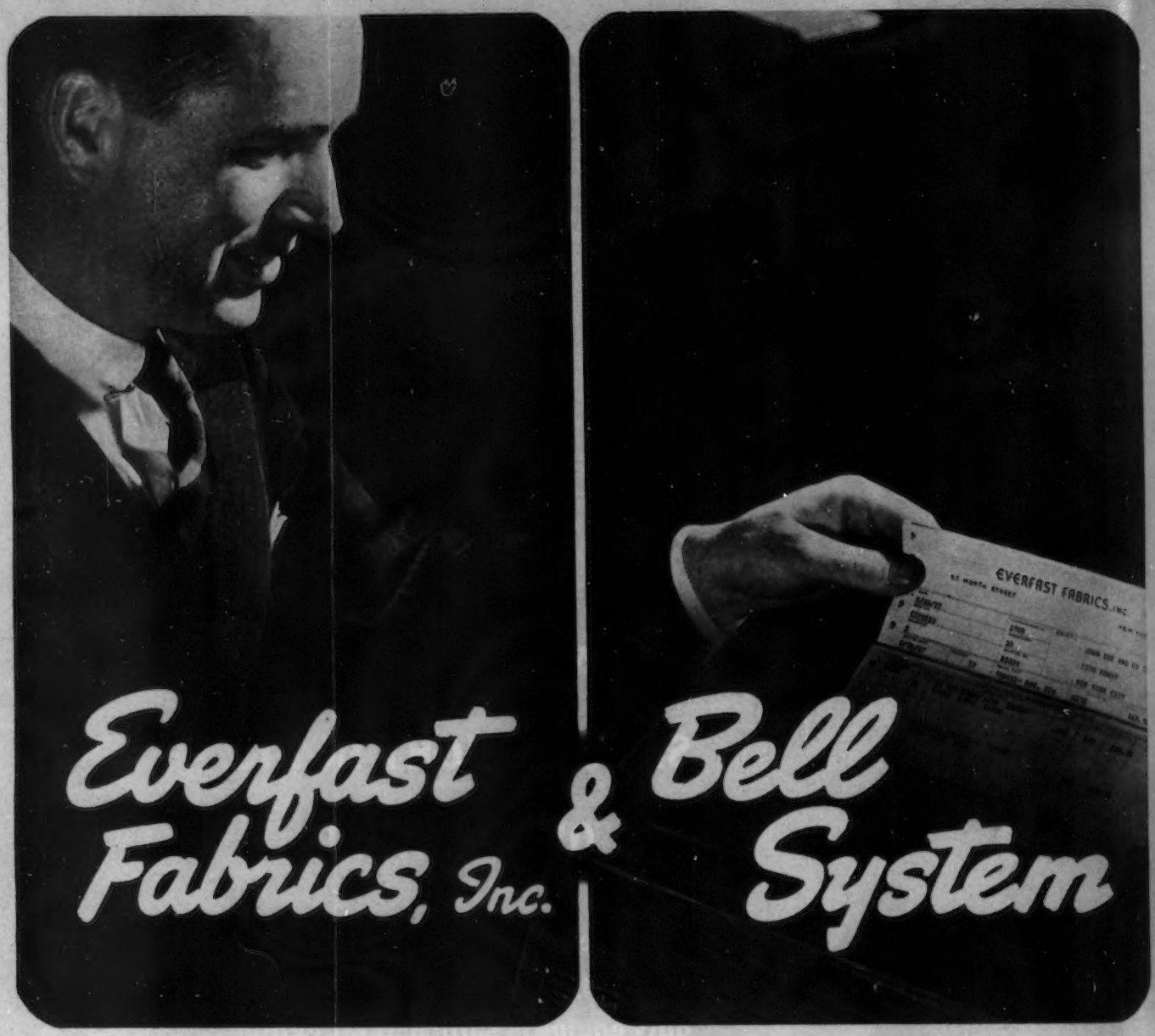
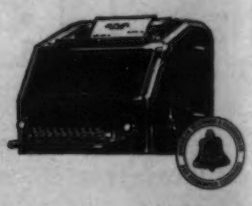
Diesels

# develop new efficiencies with Private Line Teletypewriter Service

A get-together between the heads of a business and Bell System representatives can often effect far-reaching savings throughout the business.

For example, Everfast Fabrics, Inc., needed a rapid, accurate form of communication between its New York office and the "finisher's" plant in Wilmington, Delaware. Bell System representatives offered to analyze the existing set up with company officials.

Together they found that Private Line Teletypewriter Service would not only solve the communications problem, but also effect new efficiencies in order handling . . . that it would speed-up shipments a whole day, strengthening customer good will . . . would save $50 per month over former equipment costs . . . would reduce the average time for transmitting orders by 40% . . . and that one teletyping, with carbons, would provide the order form, invoice, billing record, production guide, packing slip, and parcel post label.

Naturally under these circumstances Everfast installed the service. A similar co-operative survey may lead to new efficiencies in your business. Call your local telephone office.



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ALL our efforts have been concentrated on one product — STAMPINGS—for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.

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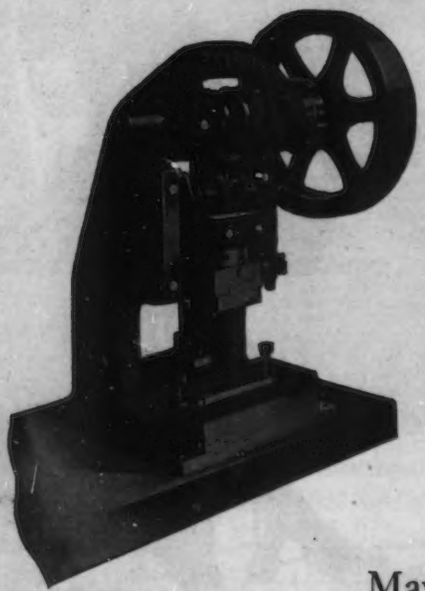
# BARGAIN



## No. 1 BAIRD Double Action Open Back Bench Power Presses

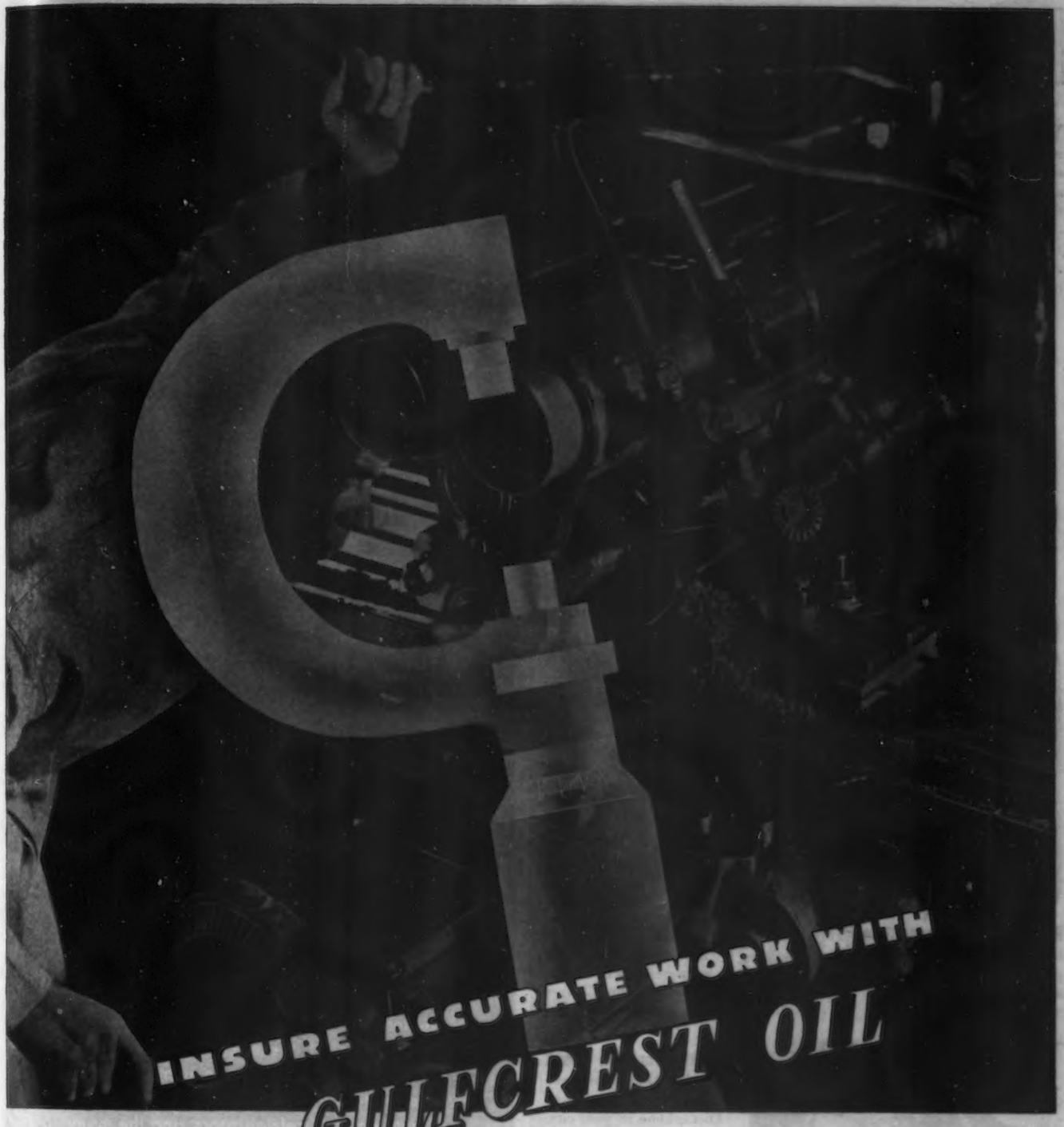
### Approximate Specifications

| | |
|---|---|
| Height from Bed to Center of Shaft | 16¾" |
| Stroke of Slide | ¾" |
| Diameter of Shaft in Bearings | 3" |
| Diameter of Shaft Crank Pin | 1⅞" & 1⅜" |
| Stroke Diameter of Drawing Plunger | 1½" |
| Diameter of Drawing Plunger | 1 5/16" |
| Maximum Depth shell can be transferred | ½" |
| Maximum Diameter Blank to cut and draw | 1¼" |
| Adjustment of Slide | ½" |
| Height, Bed to Slide (Slide down, Adjustment up) | 6" |
| Height, Bed to Ways | 6" |
| Width between Uprights | 7½" |
| Center of Slide, Back to Uprights | 3½" |
| Center of Slide to Front of Bed | 3½" |
| Bed, Front to Back | 6½" |
| Bed, Side to Side | 13¼" |
| Die Bed Holes ½" tap No. 1, ⅝" tap No. 2 | 7½" c. to c. |
| Diameter of Opening in Bed | 2½" |
| Diameter and Face of Balance Wheel | 14" x 2¾" |
| Weight of Balance Wheel | 50 lbs. |
| R. P. M. of Balance Wheel | 150 |
| Height, Floor to Top of Bed | 32" |
| Weight | 250 lbs. |

**$157.50**

May be had with Iron Table 18" x 24"—$22.00 extra.
While they last an overstock of these presses is available at the half price quoted.
May also be had with Automatic Feed Attachments at extra cost.

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.




"We must avoid wear in the spindle bearings of this milling machine — for inaccuracy in the bearings would mean inaccuracy in the work. So we use the best oil we can get — Gulfcrest Oil," says the manager of this plant. (Gulfcrest is refined by the same exclusive Gulf process as Gulfpride, the World's Finest Motor Oil.)

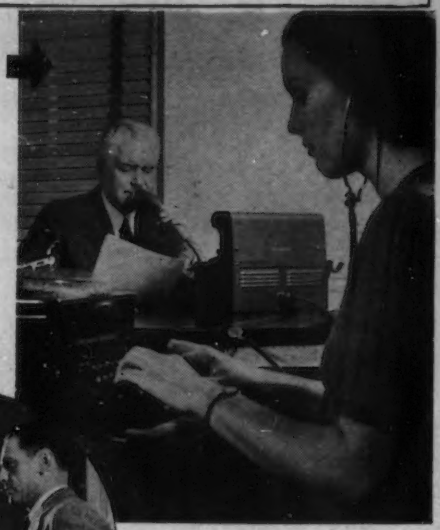
After you make a substantial investment in precision machinery, isn't it good business to protect it with the best lubricants available? The cost of the highest quality oil is trivial when it is considered that proper lubrication is vital to efficient operation and continuous production.

In Gulf's complete line of 553 quality oils and greases, are lubricants exactly suited to the requirements of each and every machine in your plant. Let a Gulf engineer recommend proper lubrication practice for your equipment. He can help you effect long range economies which will show up on the profit side of the ledger.

**Gulf Oil Corporation** GULF INDUSTRIAL LUBRICATION **Gulf Refining Company**

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

# When Detail is No Problem



**You're most valuable,** when you're free from detail. Free to think and plan . . . to do those things no one else can do for you. *Dictaphone frees you for these things as shorthand never can.*

**While you dictate,** for instance, your secretary needn't be just a shorthand machine. Dictaphone lets her keep on being a *secretary*. Getting things done . . . guarding you from interruption.

**Routine takes less time.** You handle it as it arises with Dictaphone. In the moment of fresh attention. Gets routine off your mind, off your desk.

**Too many good ideas** die of sheer inertia. With Dictaphone at your elbow, the vaguest hunch is outlined for further thought. Clearer ideas are set into action at once.

**Make your own check** of what Dictaphone will really do for you. Phone Dictaphone in your city. Let us put one of these modern dictating machines on your desk. There's no obligation. Phone us, or mail the coupon now.

THE TREND TO

# DICTAPHONE

SWEEPS ON

Dictaphone Sales Corp., 420 Lexington Ave., New York City I-10
In Canada—86 Richmond Street, West, Toronto

☐ Please let me know when "Two Salesmen in Search of an Order" will be exhibited in my city.
☐ I want to see your representative.

*Name*_____
*Company*_____
*Address*_____

The word DICTAPHONE is the Registered Trade-Mark of Dictaphone Corporation, Makers of Dictating Machines and Accessories to which said Trade-Mark is Applied.

# Bundy Tubing Contributes Dependability

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Bundy Tubing is rolled from copper-coated steel; both inside and outside surfaces are clean and free from oxides. It is available in a wide range of sizes, in lengths or completely fabricated. Quotations will be gladly made from your blueprints or samples.

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For more than 30 years we have been supplying

## Hydraulic Forging Presses

with a capacity up to 20,000 Tons, Flanging and Bending Presses, Frame Presses, Riveting Machines, Hydraulic Presses for the manufacture of steel tubes, Ingot Breakers, Shears, Mandrel Staving Presses, Tube Upsetting and Testing Presses, Punching and Drawing Presses, Hydraulic Tube and Rod Extrusion Presses of horizontal or vertical type.

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**39 Broadway, New York, N. Y.**

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**ANNUAL CONVENTION, OCTOBER 18th TO 22nd, 1937**

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**Conomatics and Cone Automatics**

Are economical and accurate producers of screw machine parts up to 6" diameter, 7" milling length. They cut costs, increase production, boost profits.

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*New York State:* Syracuse Supply Co., Syracuse, N. Y.; also Buffalo, N. Y.
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*California:* C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif. Eccles & Davis Machinery Co., Inc., 1910 Santa Fe Avenue, Los Angeles, California.
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One to Six Spindles
Tapping Attachments and Multiple Heads

**GOSS and DE LEEUW**

MULTIPLE SPINDLE

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Two, Four, Five Spindles • Work and Tool Rotating Types

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Horizontal Boring, Drilling and Milling Machine

THE LUCAS MACHINE TOOL CO.

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Screw Driving
Rotary Filing
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Flexible Shafts and Machines
Vertical and Horizontal Types—⅛ to 2 H.P.
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**DAVIS KEYSEATER**

This low cost machine will handle keyseating jobs up to 1½ in.

*Write for illustrated bulletin.*

DAVIS KEYSEATER CO., 400 Exchange St., Rochester, N. Y.

17 STYLES AND SIZES

**MERRELL**

PIPE THREADING for BETTER threads MACHINES

TOLEDO, OHIO


# JUST BETWEEN US TWO

## Reaction From Knee Action

THE girl in New Departure's front cover ad on the Sept. 23 issue—the one who made you doubt the truth of Percy Hammond's observation that the female knee is merely a joint and not an entertainment—rocked the one big happy family on its collective heels.

"It's like opening up a movie magazine," says C. H. (Goulds Pumps) Kissel. The head of one of the country's major steel companies writes:

*"A humdinger! What are you trying to do with us old fellows, to say nothing about the younger ones?"*

Injecting a persimmon into a steady diet of praiseful pomegranates, J. V. S. Bishop draws a contrast between the modernism of the cover, and what is, to him, the troglodytism of our editorials.

## We'll Take a Lesson in Fence Straddling

WE will withhold answering Mr. Bishop until we have read Walter Lippmann's new book, so that we will know how to argue on both sides, in order that we may at once soothe a disaffected reader and at the same time give the impression that our convictions are as unvarying as the atomic weight of iron. We might as well throw in copper, inasmuch as this trade paper serves both the ferrous and non-ferrous fields. And will New Jersey Zinc and the Aluminum Co. please understand that it is only lack of space which prevents bringing them in, too.

## Tsk, Tsk

WE owe Mr. Bishop a debt of gratitude by referring to The Iron Age as "this sedate paper." The words are music to our ears, for, for one reason or another, we were beginning to fear that the paper was getting a bit flighty.

The assurance that we are sedate smothers any qualms we might have about the propriety of reporting that 43-10 Forty-eighth Ave., Woodside, N. Y., is the home of the WeeWee Toilet Seat Co.

Now we're worrying that a certain composite photographic spread in next week's coruscating National Metal Exposition Number may start a thunder of tsk-tsk's which will cause our reputation for sedateness to shiver like an orange grove in one of Miami's 100-mile-an-hour zephyrs.

## State Unstated

A LETTER from a Dallas manufacturer this week is headed simply "Dallas, U.S.A." There are exactly thirteen Dallases in this country. We can guess which one the letter came from, but we would rather be sure. The omission of the state serves no useful purpose and is merely annoying.

The same thing applies to companies in big cities which leave off the street address. We don't contend that the General Electric Co. should print on its letter, "1½ River Road, Rear, Schenectady, N. Y. Ring doorbell marked McGinnis." Reason should rule. It is better to err on the side of too much information rather than too little, inasmuch as the customers usually outnumber the creditors.

## Fight

"IT is my pleasure," says A.W.L. politely, "to correct your erroneous statement that if you bind a wheel of 2 ft. circumference center to center with a wheel of 3 ft. circumference both move three feet in one complete revolution." (See page 147, Sept. 16 IA).

WE *know* we're right, for, being mathematically moronic and pragmatically inclined, we experimented with two typewriter erasers, carefully recording their lineal travel on a letterhead. The reader with the military initials continues:

*"You should use an elevated track and let the larger wheel hang over and sometime thereafter during one complete revolution of the 2 ft. circumference wheel, you would gain a free foot of circumferential movement that could be used to take the lag out of belts or chains or lag screws."*

This thing is getting over our head, so we are dumping it into the lap of Frank Juraschek, our industrial power transmission expert. We would rather play with the problem of arranging six cigarettes so that each one touches the other five.

## Dawn Man Reads Iron Age

WHEN our Pittsburgh representative asked a new advertiser whether any inquiries had been received, the answer was:

*"You bet—several—one from a Michigan manufacturer, written in longhand at 6 A. M. He said he was looking at The Iron Age at that hour and wanted information immediately concerning our product."*

It must be love.

—A.H.D.